

ADULT LEARNING ENVIRONMENTS: REQUESTS
UPON AND PREFERENCES OF
INTERIOR DESIGNERS

By

W. JINNINGS BURRUSS, JR.

Bachelor of Science
University of Central Arkansas
Conway, Arkansas
1993

Bachelor of Science
University of Central Arkansas
Conway, Arkansas
1995

Master of Science
University of Central Arkansas
Conway, Arkansas
1995

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
The Degree of
DOCTOR OF EDUCATION
May 2004

ADULT LEARNING ENVIRONMENTS: REQUESTS
UPON AND PREFERENCES OF
INTERIOR DESIGNERS

Thesis Approved:

Gary J. Loutis

Thesis Advisor

James Horne

Robert E. Nolue

Alfred Saluzzi

Dean of Graduate College

ACKNOWLEDGMENTS

I would like to give great thanks and appreciation to my advisor Gary Conti and his wife Linda Conti for all the help and encouragement they give through out this process. I would also like to recognize the contributions of my very dear and close friend, Linda Evans. If it had not been for her help, I would not have completed this degree. In addition, this degree would not have been able to have been completed without the encouragement and support of Dean, James G. Hromas, and Kay Keys. I would especially like to thank my best friend and roommate Robert Estes for putting up with the piles of paper, for checking page numbers and everything else he has put up with while I completing this document of this size.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
Background	1
Interior Design Profession	3
Continuing Education in the Interior Design Profession	5
Adult Learning	6
Androgogy	7
Self-Directed Learning	10
Servicescape of the Learning Environment	11
Classroom Styles	14
Ambient Conditions	15
Lighting	15
Color Selection	16
Visual Consideration for Adults	18
Problem Statement	19
Purpose Statement	20
Research Questions	20
II. REVIEW OF THE LITERATURE	22
Interior Design and Adult Learning	22
Servicescape of the Learning Environment	34
Classroom Styles	36
Ambient Conditions	37
Color	40
Texture	42
Lighting	44
Light Sources	47
Characteristics of Light	50
Visual Considerations for Adults	51
Changing Physiology of the Eye	53
Summary	56
III. METHODOLOGY	57

Design	57
Sample	58
Questionnaire	59
Questionnaire Design	60
Validity	61
Electronic Research Issues	63
 IV. FINDINGS	 79
Introduction	79
Profile of University Interior Designers	79
Service Orientations	83
Perceptions of Design of Learning Space	84
Consultation of Others when Designing	85
Administrators and faculty preferences of	
Design Elements	85
Seating Style	86
Furnishings	88
Layout: Fixed Versus Flexible	90
Layout: Room Arrangement	92
Color	94
Lighting Design	95
Switching	98
Preferences of Interior Designers	100
Work Experience and Design Choices	110
 V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	 115
Summary	115
Service Orientations	116
Design Elements	118
Preferences of Interior Designers	121
Service Conclusions	124
Design Element Conclusions	129
Recommendations and Future Research	144
Conclusion	146
 BIBLIOGRAPHY	 150
 APPENDIXES	 164
Appendix A: Survey	164
Appendix B: IRB	193

LIST OF TABLES

Table	Page
1. Factors of Servicescapes and Knowles Step One of Program Planning Model as Related to Questions in Survey Instrument	64
2. Frequency of Demographic Variables	80
3. Distribution of Participants by State	83
4. Frequency of Seating Style Response	88
5. Frequency of Furnishings Response	90
6. Frequency of Layout Type Response	91
7. Frequency of Room Arrangement Response	94
8. Frequency of Color Schemes Response	96
9. Frequency of Lamp Types Response	98
10. Frequency of Switching Design Response	100
11. Distribution of Interior Designers' Preferences for Furnishings	101
12. Distribution of Interior Designers' Preferences for Furnishing Layout	102
13. Distribution of Interior Designers' Preferences for Light Color	104
14. Distribution of Interior Designers' Preferences for Switching	105
15. Distribution of Interior Designers' Preferences for Color Schemes	106

16. Distribution of Interior Designers' Preferences for Texture	107
17. Distribution of Interior Designers' Preferences for Flooring Type	108
18. Distribution of Interior Designers' Preferences for Carpet Type	109
19. Distribution of Interior Designers' Preferences for Carpet Pile	110
20. Chi Squared of Years of Experience and Design Choices	111
21. ANOVA of Design Element by Years of Design Experience	114

CHAPTER 1

INTRODUCTION

Background

Today, there are many contradictory ideas about what makes a "quality" learning space (Blackett & Stanfield, 1994; Owu, 1992; Vaughan, 1995). A classroom should incorporate a layout which directs the learner's attention toward the facilitator of learning as well as the presentation area but which allows for interaction with other learners (Owu, 1992). The same learning space should be flexible enough to accommodate both large and small groups and changes in technology (Keown, 1999). The decisions made about the layout/servicescape of a learning space/environment by designers and adult educators provide appreciable evidence regarding the beliefs about what learning experiences should be like and what role the facilitator of learning and the learner play in the space (Markel, 1999).

Adult learners are returning to the college campus to

participate in educational experiences (Duckenfield, 1995). Nearly one-half of the adult population participates annually in continuing education activities. It is estimated that adult learners make up 42% of the undergraduate students and 60% of graduate students in the United States (University Continuing Education Association, 1998). These adults may be returning to retrain for a new career, update information for promotion, or earn a degree in a field of interest.

Many adult students come from professional fields, and they expect learning to be conducted in a professional environment. These adults also expect learning to be collaborative in nature (Knowles, 1980). They are willing not only to learn from the facilitator of instruction but to have an active role in the learning process (Duckenfield, 1995). Learning is a lifelong process, and the physical environment must not detract from this process (Knowles, 1980)

Interior designers and adult educators understand that design of a space can hinder or enhance learning. Astute interior designers and adult educators recognize the ability of interior design to influence the way in which occupants

see a space (Baker, Berry, & Parasuraman, 1998). In addition, they recognize design as a means of giving a space character or ambiance (Kirby, 1999; Pile, 1995).

The lighting level, selection of color, placement of furnishings, and ambient conditions within a learning space give crucial clues to the adult learners. The interior can indicate to adult learners the type of instructional delivery employed and the philosophies of the institution.

These and other factors present challenges for designers as they provide pleasing and functional environments. These environments create the ambiance that is expected of collaborative learning classrooms, training rooms, and conference centers and facilitates learning in an effective manner (American School & University, 1998; Kirby, 1999; Markel, 1999).

Interior Design Profession

Interior design as a profession has matured significantly in this century. Today it is a complex and specialized discipline which employs skills and abilities that entail technical and artistic training as well as considerable knowledge of materials, furnishings, space utilization, and their interactions within the interior

environment (Nielson & Taylor, 2001; Pile, 1995). The National Council for Interior Design Qualification defines interior design as:

The interior design profession provides services encompassing research, development, and implementation of plans and designs of interior environments to improve the quality of life, increase productivity, and protect the health, safety and welfare of the public. The interior design process follows a systematic and coordinated methodology. Research, analysis, and integration of information into the creative process result in an appropriate interior environment. (Thompson, 1992, p. 39)

Today's interior designer not only designs functional interiors but also develops creative solutions to interior challenges by coordinating and fulfilling the needs of the client through the selection of materials and furnishings and through space planning of the interior environment. Successful interior designers have attributes that allow them to have insight into personalities and problems and to resolve them with enthusiasm, creativity, and flexibility. This insight results in a keen perception of the needs of a client and promotes efficiency and the organization of the project (Allen, Stimpson, & Jones, 2000; Nielson & Taylor, 2001; Pile, 1995).

Continuing Education in the Interior Design Profession

In today's fast paced, ever-changing world, the notion of education being complete once the degree is awarded has long passed. Changes in the world and in the needs of the interior environment have become staggering. In order for design professionals to keep pace with these changes and demands, they must participate in continuing educational and professional development activities (Pile, 1995; Thompson, 1992).

In 1989, the American Society of Interior Designers (ASID) established the Education Research and Development Committee. The committee is charged with researching and developing all areas of professional education. This includes courses at the intermediate and advanced levels as well as courses that address specific design specialities. These courses are delivered at various state, regional, national, and international meetings of differing design organizations. Many of these courses are also delivered through cooperation with local college and university continuing education programs. The committee is also charged with studying differences in learning situations, including

content, instructor qualification, delivery modes, and program evaluation (Thompson, 1992).

In an increasingly competitive market, designers often have limited time available to participate in continuing education activities. However, it has never been more important for professionals to remain active in learning new technical and design applications if they hope to remain competitive in the market place (Nielsen & Taylor, 2001; Pile, 1995; Thompson, 1992).

Adult Learning

The idea of adult learning runs hand-and-hand with the task of living. Learning starts at birth and ends when brain and cardiac functions cease (Kidd, 1973). As learners transition from infancy to adulthood, they begin to understand the importance of gaining new skills in order to better function in expanded life roles. This intrinsic desire motivates adult learners to acquire skills that enable them to adapt to their environment and to survive and thrive in today's society (Knowles, 1980).

Knowles (1980) has developed a seven-step process for planning and operating educational programs for adults (p. 54). The incorporation of these seven components of adult

learning is crucial to the success of an adult education program. Knowles advocates that the facilitators of adult education programs should use the seven-step model as a framework to supply the mechanics and resources for helping learners attain information and skills.

In the first step of the seven-step model, Knowles addresses the physical environment. The physical environment is basic in establishing a climate conducive to both physical and psychological learning (Knowles, 1980). The components of the physical space in which learning takes place includes the type and placement of furnishings, color selections, lighting, and thermal conditions. It should be free from noise. This physical environment should promote a learner-centered atmosphere where democracy, trust, mutual respect, active listening, friendliness, and cooperative learning take place (Knowles, 1980). Other key concepts of adult learning related to the learning environment and are andragogy and self-directed learning (Merriam & Cafferalla, 1999).

Andragogy

In studies involving the practices of adult learning, one should be familiar with the model of learning known as

andragogy. Andragogy is defined as the art and science of helping adults learn (Knowles, 1980). This model was popularized by Malcolm Knowles, who is acknowledged as the father of andragogy, and first used by Alexander Kapp, a German grammar school teacher. (Knowles, Holton, & Swanson, 1998).

Traditional styles of instruction use a teacher-centered model of instruction, often referred to as pedagogy. The model of pedagogy is still in use today in elementary, secondary, and post-secondary venues (Knowles, 1980). This method of instruction treats adults learners as passive instruments of learning who exist for the purpose of accommodating knowledge in order to convey it back in an approved form. In the pedagogical model, the delivery and control of the information rests with the instructors, who direct the process from their own cognition.

Adult education has replaced the pedagogical model with the andragogical model. This model assumes the adult learner will take an active part in the learning process. Andragogy allows learners to be the directors of their own learning processes and needs. Therefore, the instructor serves as a facilitator in the process (Knowles, 1980).

Knowles developed andragogy as a model to explain the teaching-learning process for adult learners. In the original model, Knowles (1980) identifies four main assumptions of learning that are different for the model of pedagogy: changes in self-concept, role of experience, readiness to learn, and orientation to learning.

As the learner matures, the learner's self-concept moves from being dependent on others to one of increasing self-directedness. The role of experience allows the learner to draw from past experiences to broaden the learner's base of knowledge. The andragogical approach to readiness to learn assumes the learner as ready to learn those things needed for roles as workers or members of organizations, and for leisure-time or other life activities. Regarding orientation to learning, the adult comes into an educational activity to learn new information for the improvement of life or to participate in a new activity. Knowles later added two more assumptions (Knowles, Holton, & Swanson, 1998). The assumption of need to know involves the learner knowing why one needs to learn something before undertaking the project. The last assumption is motivation. Motivation deals with the

learner's desire for knowledge coming from an internal source. Knowles has also stated the model, while effective for learners at all stages of life, has been proven most effective for adults. This is because their established convictions and experiences are considerably more vast than those of children (Knowles, 1980).

Self-Directed Learning

Much research has been conducted on self-directed learning during the last few decades; however the process has been used by people for centuries (Knowles, 1990). During the past twenty years, the field of adult education has become increasingly interested in the processes of self-directed learning (Long, 1992). The "idea" of self-directed learning is described as "a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (Knowles, 1975, p. 18).

Learning endeavors in today's information age utilize the processes of self-directed learning. These learning activities can be as simple as taking a continuing education

class on photography at the local community college or as complex as learning about building an addition to a home. The processes can be employed on one's own or in groups, both formal and informal. As early as 1978, it was estimated that 90% of all adults conduct at least one self-directed learning project and that 70% of all adult learning is self-directed (Tough, 1978).

Any attempt to categorize self-directed learning would destroy the true meaning of the concept. However, any process of learning that allows the learner to control the decision-making process can be considered self-directed learning. "It is self-initiated. Even when the impetus or stimulus comes from the outside, the sense of discovery, of reaching out, of grasping and comprehending comes from within" (p. 5).

Servicescape of the Learning Environment

Physical environments may also be described as servicescapes. The elements of the learning environments servicescape include surface materials, ambient conditions, type and placement of furnishings, and classroom style (Bitner, 1990; Kirby, 1999; Ledford, 1981). Surface materials include color selection, texture, and form.

Ambient conditions are comprised of temperature, acoustics, and lighting levels. Type and placement of furnishings include seating, work surfaces, other furniture items selected, and their placement within the learning space. Classroom style, the manner in which a learning space is set up, can be either flexible or fixed. The interactions of the surface materials (texture and color), ambient conditions, and light play key roles in the learning situation and behavior (Bitner, 1986, 1992; Markel, 1999). In adult learners, the processes of aging, such as physical changes in vision, the need for better support in seating, and changes in hearing, can affect response to these interactions (Knowles, 1990; Torbert, 1987).

Changes in learner behavior are best accomplished by changes in the learner's environment (Kurpius, 1978; Torbert, 1987). Therefore, facilities and services play a major role in fulfilling the needs of the adult learner. If adult educators and designers of adult learning spaces could be persuaded to view themselves as businesses and learners as consumers, their relationship with learners would be vastly different. Service-based businesses know that their very existence depends upon their ability to provide the

service which the consumer desires (Kurpius, 1978).

Servicescapes are a combination of many factors that influence the individual's response to that environment. These factors include furnishings, light color and intensity, color of decor, thermal conditions, sound, and odors (Mehrabian & Russell, 1974). They combine to create the space's ambiance (Bitner, 1992). Factors such as temperature and acoustics also affect individuals. These factors create a balance or imbalance that can enhance or limit the effectiveness of adult learning spaces. Each factor should be given careful consideration in classroom design (Torbert, 1987). If the environment is not pleasing to those individuals for whom the environment was intended, they may simply choose not to use the space (Bitner, 1986; Booms & Bitner, 1982).

Environmental factors impact internal responses and behaviors of individuals within a space's servicescape. Factors of the physical environment include all of the objective and subjective physical variables that can be controlled by the educational establishment to enhance learners' actions (Baker, 1987). These factors include a

plethora of possibilities such as lighting, color, signage, textures, quality of materials, style of furnishings, layout, wall decor, and thermal conditions (Bitner, 1992). Factors can be grouped under different types of conditions although all are important to the servicescape. They include (a) classroom style, (b) ambient conditions, (c) lighting, (d) color selection, and (e) visual considerations.

Classroom Styles

Classroom style is an important, albeit difficult to change, factor in servicescapes. Traditional college classrooms and instructional areas consist of desks that are either bolted to the floor or not easily reconfigured for interactive learning (Markel, 1999). Other college classrooms may be large lecture halls which are not conducive to collaborative learning (American School & University, 1998). These styles of learning environments focus attention on teacher-delivered content to the student.

There are two primary types of learning environments. The first is Fixed design classrooms, and the second is Flexible designed classrooms. Fixed designs are typical of the conventional large lecture hall, the tiered classroom, and camera-equipped classrooms (American School &

University, 1998). Flexible classroom designs include small seminar rooms, conference style rooms, and other rooms designed to accommodate about 20 to 30 learners (American School & University, 1998).

Ambient Conditions

Ambient conditions are those that generally affect an individual's five senses of sight, hearing, smell, touch, and taste. Awareness of these conditions is often a result of their existing at an unpleasant level or through their absence. For example, if the lighting is too bright or casts an unpleasant color, it can distract the learner or the facilitator from the task of reading information, the presentation of information, or the task of taking notes (Baker, 1987).

Lighting

The overarching goal of lighting in a learning space is to provide a visual environment for both adult learners and facilitators of learning that is supportive of the learning processes (Michel, 1996; Rea, 2000; Smith & Bertolone, 1986). This can be achieved only if the users of a space can see their visual task accurately, quickly, and comfortably (Hawkins, 1991).

Almost no attempt by facilitators of learning and learners to create a positive learning environment will prevail over poor light design. At the same time, it is critical to provide functional, conservative, energy-efficient lighting that is appealing to the end-users. When designers demonstrate no regard for human needs, the users either struggle or create their own relief. Generally, this results in not returning to that environment. Lighting design should not be approached as a choice between aesthetics and effectiveness; lighting designers and adult educators that are creative and resourceful can provide both (Hawkins, 1991).

Color Selection

Color plays an important role in the way people act and interact in their environment (Hawkins, 1991; Pile, 1995). Color researchers find that the warm colors such as red, orange, yellow, and pink are predisposed to encourage learners to be active. Cool colors, such as blue, grey, and green, are predisposed to relax them (Hawkins, 1991; Pile, 1995). Therefore, it is important to select a color appropriate for the activities of a given learning area. However, colors may affect learners differently at different

age levels and in different learning activities. For example, colors used effectively in a freshman dormitory may not be appropriate in adult learning spaces (Hawkins, 1991). Additionally, the type of lighting used in a space may affect color in subtle ways, so the association between light and color should always be considered in the design of learning environments (Rea, 2000).

Interior designers and adult learning space planners should recognize the effect of color and how color can influence the perceptions of users of the learning environment. For any given color, there is an associated effect. Color may be used to invoke feelings of warmth, coolness, dimension, size, and distance. Properly used color makes an important contribution to an improved learning space (Hawkins, 1991; Pile, 1995). Cool colors are calming and restful whereas warm colors tend to stimulate (Hawkins, 1991; Pile, 1995). Warm colors in the learning environment are more appropriate for active learning whereas cool colors may be useful for a learning environment where learning is inactive.

Visual Considerations for Adults

Light sources that are too bright can produce uncomfortable glare in both older and younger populations. Many times, this effect is referred to as disability glare because it can impair or reduce visual performance or visibility. This is produced by the brightness veiling the task (veiling illumination). Lighting conditions that are excessively bright can produce disability glare for older individuals (Fisher & Christie, 1965). Glare thresholds are much higher for younger individuals than for those over the age of 50 (Bennet, 1977).

Those designing learning space for adults should also be attentive to aesthetics, including form, color, and visual variety (Kirby, 1999). When selecting color for an interior, people rarely consider its effect on the visual process; however it should be the primary consideration (Fehrman & Fehrman, 2000; Pile, 1995). As individuals mature into seniority, their eyes grow weaker (Fehrman & Fehrman, 2000). Older eyes simply encounter more difficulties in reading small print and in coping with glare and low contrast in color (Fehrman & Fehrman, 2000; Weale, 1961).

Problem Statement

Directly related to the assumptions of the andragogical theory, Knowles (1980) outlined seven components for planning educational programs for adult learners. Knowles' first step in the model deals with establishing a climate conducive to learning which includes both the physical and psychological environments. Indeed, Knowles points out that the climate is an extremely important factor and makes it the first component of his seven-step andragogical model. Interior designers are responsible for the design of the physical environment of a learning space. Although they are charged with the design of the physical surroundings, designers' decisions are influenced by requests of both faculty and administrators in the implementation of the design elements. Although the design has a tremendous impact on the learning environment and although theorists like Knowles have acknowledged the importance, the views of the interior designers at educational institutions about the servicescape is not known. In addition, it is not known what design elements administrators and faculty request of these designers. This knowledge is needed in order to

facilitate designs that support the needs of the adult learner.

Purpose Statement

The purpose of this study is to examine factors that influence how interior designers approach adult learning space design. This information is important to adult education because it addresses the first step of Knowles' program planning model, i.e the creation of a physical and psychological climate conducive to learning. This study dealt with the examination of university designers' views of the physical climate and design requirements as related to classroom style, ambient conditions, lighting, color selection, and visual considerations for adults for the learning space.

Research Questions

The following research questions were used:

1. In the perception of interior designers, do administrators consider adult learning as a service provided by their institutions?
2. In the perception of interior designers, do faculty consider adult learning as a service provided by their institutions?
3. Do interior designers consider adult learning as a service provided by their institutions?

4. How do administrators want interior designers to approach learning space design?
5. How do faculty want interior designers to approach learning space design?
6. How do designers approach adult learning environment design?
7. How does the number of years a designer has practiced in educational design affect selection of design elements?

CHAPTER 2

REVIEW OF LITERATURE

Interior Design and Adult Learning

A philosophical view of interior design begins with the definition which places the profession in the context of the culture. There are many who define the field as a business and others who define the field as a form of art and an integral part of what interior designers refer to as the built environment. Quite simply, interior design is a profession that is both business and art form, dealing with issues of designing a comfortable and functionally built environment when executed by knowledgeable professionals (Allen, Stimpson, & Jones 2000; Nielson & Taylor, 2001; Pile, 1995; Thompson, 1992).

The role of the designer is to confront these issues when designing learning space. Even with the best of intentions, what a designer does can have a significant impact on the learning environment. To better understand the role a designer plays in the design process, issues can

be sorted into categories of responsibility. These categories are as follows: matters within the direct control of the designer, concerns outside the designer's immediate control, and issues requiring cooperation between designer and client (Pile, 1995; Thompson, 1992).

Concerns outside the designer's immediate control are changes in projects made by those who are in control, the economic conditions which may impact design, and the completion time of projects. Due to cost and structural considerations, designers many times cannot change pre-existing conditions in poorly design structures (Nielson & Taylor, 2001; Pile, 1995).

Matters within the direct control of the designer are related to issues that are encompassed entirely within the designer's domain. These include the placement of elements in relation to windows, which can determine how much lighting and ventilation can be naturally provided as well as how many artificial ventilation systems are needed. The designer is also in control of placement of interior walls and space layout and selection of the color and texture of finish materials (Allen, Stimpson, & Jones 2000; Nielson & Taylor, 2001; Pile, 1995; Thompson, 1992).

Issues requiring cooperation between the designer and the client allow the client to have input into the project. Many times designers find themselves in the role of educator during this phase. The designer must have vast knowledge of products, finishes, codes, and wearability of products to prevent the selection of poor or inferior materials. The designer uses this knowledge and client input to produce what the designer feels best meets the client's needs (Nielson & Taylor, 2001; Pile, 1995; Thompson, 1992). In educational design, the clients are the administrators and faculty, and the consumers are the learners using the space. It is at this juncture in educational design that the designer and the client must have a clear understanding of how an adult learning space is to be used. For designers to have a better knowledge base to design adult learning space, it would be helpful if a designer understood adult learners and how the processes of adult learning would use a learning space.

A knowledge of the assumptions of andragogy and the components of planning a learning program would greatly assist interior designers in designing adult learning

spaces. The seven steps of Knowles' (1980) program planning model are as follows:

1. Setting the climate for learning
2. Establishing a structure for mutual planning
3. Diagnosing needs for learning
4. Formulating directions (objectives) for learning
5. Designing a pattern of learning experiences
6. Managing the execution of the learning experiences
7. Evaluating results and rediagnosing learning needs. (p. 59)

The first step in the model deals with establishing a climate, both physical and psychological, that is conducive to learning. The physical environment includes provision for creature comforts to avoid blocks to the learning process. This includes temperature, ventilation, comfortable chairs, adequate light, good acoustics, and easy access to refreshments and restrooms (Caffarella, 1994; Draves, 1995; Knowles, 1980). Ecological psychologists have found that color selection can play a profound role in the mood and attitudes of learners. Bright colors tend to make learners cheerful and more active whereas dark and dull colors tend to create the opposite effect (Caffarella, 1994; Fehrman & Fehrman, 2000; Knowles, 1990).

In setting the climate, the design and placement of items in the space becomes incredibly important to both the learner and facilitator the of learning (Fulton, 1991; Hiemstra, 1991). Usually the design of a space is a role executed by interior designers or a design team. The role designers play in designing learning environments is important because it can make the space usable or not so usable (Pile, 1995). Just as adult educators use models and processes to plan an educational experience, designers use a five-step process to plan and execute a design project (Thompson, 1992). These steps include:

1. Intelligence--gathering of data, research, and development of a program
2. Design--producing solutions to the program
3. Choice--the client chooses the solution that best fits perceived needs
4. Implementation--putting the design program into action
5. Evaluation--involves an appraisal of the project and a close look to determine if the space is meeting the needs of the client. (p. 48)

The first step is the point with which adult educators working with designers need to be most concerned. How do adult educators tell designers the manner in which adult learners and adult program developers use learning space?

How do adult educators increase a designer's knowledge of adult learning?

One such way is to introduce designers to the theory of andragogy and its assumptions and to the components of planning adult learning programs. Designers would benefit from the knowledge that adult learners are self-directed and ready to learn. They are there not only to learn but also to bring life experiences to the table to enhance the learning experience (Knowles, 1981). Learners want to be able to discuss information with each other in a learning space (Brookfield, 1986). Learners are motivated to learn; hence, they are there because they want to be there (Knowles, 1990).

Designers with this knowledge would be able to amply fulfill the first component of implementing a plan of program development for adult learners. The most important component is "the environment" (Hiemstra, 1991; Knowles, 1980). The designers would understand the flexibility required for adult learners to work in groups and to be able to move furniture for discussions for the transfer of information and life experiences. Interior designers would better understand how to create an adult learning

environment that promoted active learning and which allows the learners to co-construct their knowledge and learning (Markel, 1999).

One such example of the incorporation of the assumptions and planning components of andragogy into the design of a adult learning facility is the Thurman White Center for Continuing Education on the University of Oklahoma campus in Norman, Oklahoma. In a recent discussion with Dr. Thurman J. White (Personal Communication, May 1, 2003), White was asked why he chose to design the Center for Continuing Education in the fashion in which it was built. White was quick to explain that adult learners came to the table with pre-learner knowledge about subject matters or what he termed "old knowledge." Adult learners are confronted with new ideas which either confirm the old ideas or refute them. In either case, adults take the new information, internalize the idea, and decide if it confirms or refutes the old information. As a result, new knowledge is built onto old knowledge or is dismissed as flawed, old knowledge and exchanged for new knowledge. White explained the best way to achieve this was to have a space in which adult learners could receive new information and then

discuss this information with other adult learners with other experiences. This assists in internalizing, enriching, and retaining the new information in a usable context (T. J. White, personal communication, April 23, 2003).

When White started down the path to provide both Oklahoma and the Southwest region of the United States with a center for adult education, he approached the Kellogg Foundation with a proposal for a matching funds grant to build such a center. The proposal included such a new and novel approach to designing such a center for adult education that the Kellogg Foundation granted the funding (Fite, 1966).

The design is based on White's many travels to other adult learning centers and venues in the United States. White also included the university architect on his trips so he could visualize the ideas White wanted to include in the center. On White's visit to the Center for Humanistic Studies in Aspen, Colorado, he found the basis for the new center's design. The Colorado center was designed by Bauhaus artist Herbert Bayer and architect Fritz Benedict. The design of the center was greatly influenced by the new

and novel teachings of the Bauhaus School in Germany (T. J. White, personal communication, May 1, 2003). The Bauhaus School was founded as a school of free thinking and learning of arts in the abstract. This is also the same country where the term "andragogy" was first used (Knowles, 1980).

The Center for Humanistic Studies is a multi-complex of buildings which included a large meeting hall, housing, administrative offices, and a building with meeting rooms. The complex is a community of learning. The Executive Seminar Building has hexagonal shaped rooms with seating arrangements where participants face each other during the discussion of ideas and the internalization of information. These rooms are arranged around a center area for forum style discussions and large group interaction. This is what White had observed in his tour of the United Nations building in New York City. White and his architect used this as the facility upon which to model their center (Fite, 1966).

With the visit to the Center for Humanistic Studies, the architect announced he now understood what White wanted in a center for adult learning (Fite, 1966). The architect and White continued to collaborate to create a kind of city

in miniature. The plan was to include buildings for group learning and meeting, housing, dining facilities, administrative facilities, and public social spaces. White focused on the individual with the aim of furthering the democratic process. He wanted a facility that would make optimum use of the values of group participation. He envisioned a design that would provoke a thoughtful and meditative attitude in the users. It was to be designed in such a way that the user gained aesthetic and cultural experiences. The simple presence of being in the center would be an educational experience. White wanted a friendly, relaxed atmosphere in which the learning process could occur (Fite, 1966; T. J. White personal communication, April 23, 2003).

At the Thurman White Center for Continuing Education, these ideas and goals were achieved through the unique and imaginative design of the Forum Building. The Forum Building was designed with a main gathering or meeting room in the center designed in the round. The room consists of approximately 500 seats. From this central room extend three wings, which contain differing sized conference rooms. All the conference rooms are constructed so that

participants in any program or discussion would be facing each other. This places attention and focus on the learners actively participating in learning and exchanging ideas and experiences (Fite, 1966).

With the completion of the center, White found the goals of lifelong learning had been achieved through the design of the complex. Moreover, the attractive and functional architecture stirred extension staff and faculty members to think about bolder and more imaginative programming to fit the new and different learning situations provided by the center design (Fite, 1966). The center provided a tremendous stimulant to the development of new adult education programs which, in turn, drew increasing outside support and participation. White's center has proven to provide an important contribution to serving the growing need for adult education in a way that has never been made possible before (Fite, 1966; T. J. White, personal communication, May 1, 2003).

In 1963, shortly after the center began operations, Emory W. Morris, President of the W. K. Kellogg Foundation, visited the center. After returning home, he wrote back claiming:

The visit to the University of Oklahoma was the highlight of my trip, and I am delighted with the investment we have made in the center. Every aspect is excellent. The facilities, program and the enthusiasm of your faculty are outstanding. I hope all of our investments in continuing education, past and future, develop at the level you have established in Oklahoma.

Many other compliments and accolades were to come White's way from the design. However, the greatest compliment was the continued success of the center (Fite, 1966).

In an industry that is becoming more and more service oriented, adult continuing education must begin to give the same efforts and energies to the design of adult learning as other service industries do in order to provide an environment for successful programming (Fulton, 1991). One such success story is the Thurman White Center for Continuing Education on the University of Oklahoma campus (Fite, 1966). Much thought and consideration of adult learning processes and applications of adult learning was given before the final design of the center was completed. Those associated with the center feel that its design has contributed to its success as a leader in adult education programs in the state of Oklahoma. Moreover, the center is an excellent example of how adult learning opportunities can

be enhanced when a climate conducive to learning is created.

Servicescape of Learning Environments

The physical environment, or servicescape, is particularly important in retailing and service industries such as restaurants where customers encounter the establishment's product and/or service (Bitner 1992). The environments created by store designers are designed to provide favorable experiences for the consumer. It is these favorable experiences that retailers hope will cause the customer to linger, buy more, and/or become a repeat shopper. These experiences are also directly affiliated with the merchandise and/or service within the servicescape of the store and are of interest to store and restaurant designers, educators, and researchers (Bitner, 1986). Researchers have sought to establish the relationship of environmental factors to the sale of merchandise. Suggestions have been made, based on findings, to control environmental factors or characteristics, such as lighting, in order to increase sales and customer comfort (Bitner, 1992).

Servicescapes are a combination of many environmental factors that influence the individual's response. Factors or

elements in the environment that affect individuals include light, color and intensity (level), color of decor, thermal conditions, sound, and odors (Mehrabian & Russell, 1974), and they combine to create the store's ambiance (Bitner, 1992). The store may be too hot or cold, the music too loud or inaudible, or the lights too dim or bright. Any combination of these elements might dissuade customers from shopping at the store. These factors create a balance or imbalance that influence the success of a retail establishment, and each factor should be given careful consideration in store design. If the environment is not pleasing to those individuals for whom the environment was intended, they simply may choose not to shop in the retail store.

These environmental factors impact internal responses and behaviors of individuals within a store's servicescape. Precisely, the factors of the physical environment include all of the objective and subjective physical variables that can be controlled by the retail establishment to enhance customer actions (Baker, 1987). These factors include a plethora of possibilities, such as lighting, color, signage, textures, quality of materials, style of furnishings,

layout, wall decor, and thermal conditions (Bitner, 1992). Just as these elements are important in the business world, they should also be taken into consideration in education. These factors have been grouped under different types of conditions although all are important to the servicescape. In the educational setting, these include classroom styles, ambient conditions, color, and lighting.

Classroom Styles

Two common types of learning environments are the Fixed design classrooms and the Flexible designed classrooms. Fixed design classrooms usually have chairs and/or desks which are bolted to the floor. Fixed design classrooms prevent learners from interacting and working in groups in the space. Fixed design classrooms imply that the learning process is one in which learning is teacher centered because desk are fixed in place and face the front of the room thus limiting the interaction of learners.

Flexible designed classrooms allow a room to be easily re-arranged to meet the needs of a particular class (American School and University, 1998; Blackett & Stanfield, 1994; Council of Educational Facility Planners, 1991; Gorham, 1981; Keown, 1999; Muller, Probasco, & Schuh, 1985;

Owu, 1992; Rath & Ittleson, 1981; Tessmer & Harris 1992). Flexible classroom designs include small seminar rooms, conference style rooms, and other rooms designed to accommodate about 20 to 30 learners (American School and University, 1998). Flexible design classrooms allow for the learner-centered approach where the learners are active with instruction centered on supporting the construction of knowledge rather than on its transmission (Duffy & Cunningham, 1996). This implies a classroom design that is more flexible in allowing learners and facilitators to rearrange the room as they co-construct this knowledge in their own personalized way (American School and University, 1998; Duffy & Cunningham, 1996).

Ambient Conditions

Ambient conditions are factors that affect human perceptions of and response to the environment. Ambient conditions in a class may include temperature, lighting, noise, or scent. These conditions generally exist below the level of the individual's immediate consciousness. Therefore, learners and facilitators may be unaware of these conditions. Learners and facilitators expect certain levels of ambient conditions to exist. Users of the space

may be oblivious to these factors unless they are absent or exist at elevated, unpleasant levels. Ambient factors or conditions such as lighting generally impact the learners' subconscious. If the lighting is too bright or casts an unpleasant color, it can distract the learner or the facilitator from the task of reading information, the presentation of information, or the task of note taking.

Acoustical design is important in learning environments to prevent noise distractions. Learning environments need to be designed in a manner to prevent or minimize noise from air conditioning systems, equipment, or neighboring rooms (Torbert, 1987). The acoustical quality of materials used in a learning space should be carefully examined and selected in order to maximize sound quality (Flynn, Kremers, Segil, & Steffy, 1992).

The physical environment requires provisions for users' comfort through the use of ventilation systems to avoid blocks in learning (Knowles, 1980). If the temperature in a learning environment is acceptable, it may not impact learners' behavior in the space. However, when temperatures are colder or warmer than optimal, the learners' awareness is heightened, creating a distraction in the learning

process. Facilities should be designed with enough insulation to prevent sharp changes in inside temperature due to outside conditions (Flynn, Kremers, Segil, & Steffy, 1992). If the learning space continues to exhibit abnormal temperature levels, learners may choose not to use the space due to the uncomfortable conditions.

There have been many work place studies that have shown that lighting, temperature, noise, music, and color have major impacts on work performance (Sundstrom & Sundstrom, 1986). The same ambient factors that have an impact on workplace performance will also influence customers' behavior in the retail venue (Bitner, 1990).

Ambient conditions, such as lighting, assume importance in the workplace because employees tend to spend extended periods of time in the servicescape (Whyte, 1980). The employee's physical comfort with elements such as temperature level, lighting, and the responses to noise level and music affect productivity. Ambient conditions are similarly important for consumers' ability to perform tasks, such as reading information, in retail stores. Therefore, it is important that there be a balance of ambient

conditions in order to meet the needs of both employees and customers in the servicescape.

Color

Colors have a significant impact on peoples' lives. For example, color plays an important role in self-presentation and in impression formation (Myers, 2004). People choose the color of their interiors, clothes, and cars depending on how they wish to present themselves (Trinkauss, 1991; Zernike, 2001).

Most color research is concerned with color preferences (Myers, 2004). Personal traits, such as extroversion and neuroticism, have been shown to influence color preference (Choungourian, 1972). There have been studies concerned with color preference in relation to skin color and color based on cultural variation (Choungourian, 1968). Studies have also been devoted to the methodology for researching color preference (Zold, Toth, & Tolna, 1986).

Researchers have examined the impact of colors on mood. Boyatzis and Varghese (1994) found that children "colored with a yellow crayon after hearing a happy story and with a brown crayon after hearing a sad story" (p. 83). This

excerpt demonstrates the close link between colors and one's emotions and behaviors.

Many people suggest that the quality of the interior environment can have a direct impact on human behavior (Myers, 2004; Zernike, 2001). In conjunction with this belief, it has been suggested that the appropriate color can enhance the overall quality of the interior environment and thus influence behavior (Myers, 2004; Mahnke, 1981). Many schools, companies, hospitals, and prisons have adopted color schemes which have been designed to produce particular affective states in their inhabitants (Hemphill, 1996).

Color has been shown to affect human moods, physiological responses, and perceptions of temperature, size, and ambiance. Warm colors (particularly red) increase human attraction to external stimuli, induce states of excitement, produce higher arousal levels, quicken muscular responses, and increase grip strength (Etnier & Hardy, 1997; Myers, 2004) In contrast, cool colors (particularly greens and blues) reduce anxiety states and are associated with extremely calm and tranquilizing moods (Hemphill, 1996).

Designers can use color psychology to modify human behavior (Pile, 1995, Zernike, 2001). Environments are

often painted orange or red colors to induce excitement. They invite learners to come in and actively use the space. Blues and greens are used in spaces to invoke restfulness and are used in environments where listening to speeches and lectures is the primary activity (Etnier & Hardy, 1997).

One such example of the systematic application of color has been evident in sports. Alonzo Stagg, a former head football coach at the University of Chicago, purposefully used a blue dressing room for rest periods and a red dressing room for fight talks to attempt to influence his teams emotions and ultimately to influence his team's performance (Trinkauss, 1991). Other such examples of using color applications can be seen in adult learning environments. Those environments using color schemes of blues, greens, and cool neutrals promote less interaction among learners than environments using reds, yellows, oranges, and warm neutrals (Hemphill, 1996; Myers, 2004).

Texture

Texture in learning environments affects acoustical qualities and reflectiveness of surface materials in a learning space (Kicklighter & Kicklighter, 1992; Michel, 1996). Rooms with all hard, smooth surfaces tend to have an

echo to them when sound is introduced. Rooms with too much texture can make it difficult for a learner sitting farther away from the individual speaking to hear what is being said (Kicklighter & Kicklighter, 1992).

It is important to have a balanced mix of textures in the learning environment to give variety and interest to the space (Kicklighter & Kicklighter, 1992; Michel, 1996).

Texture can affect color by subduing or intensifying it (Kicklighter & Kicklighter, 1992). Smooth surfaces reflect more light than rough surfaces, making them look light and brighter (Kicklighter & Kicklighter, 1992; Smith & Bertolone, 1986). Rough textured surfaces absorb more light, making them look darker and less tense (Kicklighter & Kicklighter, 1992; Smith & Bertolone, 1986).

Color and texture in the interior environment is also affected by lighting. The best selected color scheme and textures to promote learning and positive behaviors in the learning process can be negated by poor lighting color and quality. Lighting can make or break the environment in which learning takes place.

Lighting

Many studies have been conducted in order to gain an understanding of how customer behavior is influenced by the lighting environment. Servicescape attributes include music, color, scent, layout, size, shape, and light (Baker, 1987; Bitner, 1986). These attributes are all environmental stimuli, and they combine and interact with an individual's responses to the environment.

The servicescape of the environment is one of the most influential factors in the usage decision (Bitner, 1992). The primary visual dimensions of a servicescape are color, lighting (brightness), size, and shapes. These visual dimensions of color, light, size, and shapes can be manipulated to create feelings that may increase usage probability. The emotional states of pleasure and arousal, which can be greatly influenced by the space's atmosphere, can affect the user's behavior within the environment (Donovan & Rossiter, 1992).

The main goal of lighting is to create light which is bright enough to support the process of learning while keeping utility costs within reason (Grant, 1991). One way to achieve this goal is to use correct lamps and provide

correct combinations of general and accent lighting to control user behavior. One such system widely used in learning space is fluorescent lighting. This system is usually chosen because of low operating cost that results from lower energy consumption and from longer lamp life than with other lighting systems (Ward, Bitner, & Barnes, 1992).

Lighting level and color play important roles in defining the environment's servicescape. Light levels may be used to highlight and accent merchandise or define areas of interest within the environment of the servicescape. More importantly, lights of medium to low levels combined with warm color can evoke feelings of warmth and make an environment which is inviting and pleasant whereas lights of cool color and high levels can create feelings of being rushed and a cold or rigid environment (Goodman & Smith, 1992; Weishar, 1992).

The scale used to describe a light's color spectrum balance or rendering quality is the Color Rendering Index (CRI). Lights with a CRI of 95 to 100 contain a full or more balanced spectrum of colors in their make up; this is normally indicative of natural daylight. Most older fluorescent lights have a color rendering index of 50 to 65,

which gives a cool feel and a blue cast or unbalanced spectrum to the light produced. Cool lights are characterized by the absence of the longer wave lengths in their make-up and the elevated levels of shortwave length light (Nuckolls, 1983).

The color of light is usually defined as the lamp's color temperature. The lamp's color temperature is measured in degrees Kelvin. As the color temperature of the lamp increases, the cooler the lamp will appear in color; likewise, as the color temperature of a lamp decreases, the warmer the lamp will appear in color.

Both color temperature and CRI are used to describe a lamp's color. These are noted on the lamp itself or the lamp's specification information. Many times two different lamps will be noted with the same color temperature but with different color rendering indices. The color temperature of a lamp may affect the arbitrary translation of brightness or intensity. Cooler-toned light sources of the same intensity as warmer-toned complements may seem to appear brighter; therefore, warmer light requires higher intensities or more lamps at the same intensity to produce the same effect as the cool light (Flynn, Kremers, Segil, & Steffy, 1992).

Light Sources

There are many types of light source lamps available for use in public areas. In retail store design today, the most commonly used are fluorescent and incandescent in respective order (Pile, 1995). Other types finding their way into retail outlets are neon, cold cathode, metal halide, and high pressure sodium. Many times they are used to create an accent or mood in a particular part of the retail environment (Nielsen & Taylor, 2001).

Incandescent lamps are the oldest and most common form of electrical light. Like sunlight, candle light, or oil lamp light, incandescent light has a continuous spectrum that includes all colors of the white light spectrum. However, the white of the incandescent light contains much more red and yellow and less green and blue colors than does daylight, making it much warmer (Pile, 1995). This warm color tends to be appealing as well as flattering to human coloring (Kicklighter & Kicklighter, 1986) and is suggestive of coziness and comfort (Nielsen & Taylor, 2001; Pile, 1995).

Incandescent light can be made to serve virtually all lighting needs, but it presents some economic problems.

Incandescent lamps are the only light source which can be readily and cheaply dimmed. Incandescent light uses much of the electrical energy it consumes to produce heat, which is often an unwanted by-product (Kicklighter & Kicklighter, 1986). This makes incandescent lamps costly in terms of power consumption per lumen produced. This in turn creates an extra load on summer air conditioning. As a result, incandescent light sources are rarely used in factories, office buildings, and other structures that require large amounts of electricity. Since users are not as concerned with economic factors, incandescent light is generally preferred for most residential uses (Pile, 1995). It is also widely used in places that benefit from its point-source characteristic (optical control) as well as in middle to higher-end stores for displays where it is flattering to merchandise, in middle to higher-end restaurants where it renders both people and food attractive, and in other locations where aesthetic considerations take precedence over economics (Nielsen & Taylor, 2001).

Fluorescent lamps were developed as a highly economical alternative to incandescent lamps in the 1930's. Fluorescent lamps' power consumption is about one-

third to one-fourth that of incandescent lamps for a given light output. Fluorescent lamps produce three to four times as much light per watt of power consumed. Consequently, the lamps produce less heat energy to produce an equal light level, which in turn saves on cooling costs in many commercial facilities. For these reasons, fluorescent lights became the norm for classrooms, factories, offices, restaurants, and stores that strived for lower energy bills (Kicklighter & Kicklighter, 1992; Pile, 1995).

Fluorescent light traditionally has one troublesome characteristic, which is poor color quality. The older fluorescent lamps' color spectrum contained more blue or cool colors than the other colors used to produce white light, and this causes many colors to change in appearance. This problem was addressed by the introduction of lamps in a variety of white colors, such as warm white light, deluxe white light, or natural white, which improves the lamp's color rendition (Kicklighter & Kicklighter, 1992). Because these types of lamps are slightly more expensive to purchase as well as to operate, many stores use standard cool white fluorescent lamps to save money (Nielson & Taylor, 2001).

Characteristics of Light

The portion of the electromagnetic spectrum that is visible to the human eye (visible light) is from 380 to 770 nanometers. The electromagnetic spectrum includes higher and lower wavelengths that are not visible to the eye's infrared waves on the longer wavelength and ultraviolet on the shorter wavelength end of the spectrum (Pile, 1995).

The different wavelengths of visible light produce different color responses with blues at the lower end of the visible range and reds at higher wavelengths. White light contains all these wavelengths but not necessarily in equal amounts. If white light passes through a prism, the light is refracted into its rainbow of component colors (Flynn, Kremers, Segil, & Steffy, 1992).

Light striking an opaque object is either absorbed or reflected. For example, a blue ball will absorb all wavelengths except the blue wavelengths. However, the perceived color depends upon the light source. To see a color accurately, the color must be present in both the object and the light source. For example, if the blue ball is illuminated by a light source with little or no blue wavelengths, the ball will reflect poorly and appear to be

dull and not as blue as it really is (Nielson & Taylor, 2001). This also can be experienced in retail stores when trying to match paint color, fabrics, or clothing. In the store, the items seem to match, yet at home under different light sources, the colors do not match. This phenomenon is known as metamerism (Kicklighter & Kicklighter, 1992).

Visual Considerations for Adults

Visual comfort can be affected by one or more of the following factors: discomfort glare, disability glare, and veiling reflection. Discomfort glare is the annoyance or pain caused by high luminances in an individual's field of view. The degree of discomfort glare depends on the size, and level of luminance, as well as the number and position of glare sources. Background luminance is also a factor with the most common causes being windows or luminaries (Bennett, 1977). It has also been found that older observers show increased susceptibility to discomfort glare (Carter, 1982). Light sources that are too bright can produce this effect in older as well as younger populations.

Many times this effect is referred to as disability glare because it can impair or reduce visual performance or visibility. This is produced by the brightness veiling the task (veiling illumination). Lighting conditions that are excessively bright can produce disability glare for older individuals (Fisher & Christie, 1965). Glare thresholds are much higher for young individuals than for those over the age of 50 (Bennet, 1977).

Disability glare, which is also called veiling luminance, results from light scattering within the eye, which in turn decreases contrast and reduces visibility. The most common example is the glare on glossy magazine pages which makes the information on the page difficult to read. Disability glare can occur with or without discomfort glare and veiling reflections (Flynn, Kremers, Segil, & Steffy, 1992). Veiling reflection is the reflection of a large luminance area on a task. This results in a loss of contrast between the task and the background. Veiling reflections are usually caused by the task being placed in front of windows or under luminaries (Bennet, 1977).

As adults mature, their eyes grow weaker (Fehrman & Fehrman, 2000). It is more difficult for them to read small

print and deal with glare. Signage and/or information presented in learning environments that use poorly contrasting colors are difficult for older adult learners to read (Fehrman & Fehrman, 2000).

Walls, floors, window treatments, and furniture should be selected carefully to avoid low contrast between objects and to prevent excessive glare (Fehrman & Fehrman, 2000). Floor colors should not be so dark as to introduce excessive brightness contrast between task or work surfaces and floors (Pile, 1995). Work surfaces need to be of fairly light tones to minimize contrast with task materials which are typically printed on white paper (Pile, 1995). Natural colors should be used in the space which will soften a space and give it a personable character (Pile, 1995).

Changing Physiology of the Eye

The changing physiology of the aging eye can change the visual requirements of an adult learner. People's eyesight begins to deteriorate as they get older. This deterioration may create the need for corrective devices, such as glasses or contact lenses. In some cases, individuals resort to surgical procedures to correct their vision deficits. In addition to these mechanical vision corrections, many aging

individuals simply require more and better light sources to perform daily tasks efficiently (Kline, 1994).

There are many physiological factors and changes in the lens and pupillary central system that account for the deterioration of the aging eye (Duke-Elder, 1968). One change in the lens is through its continued growth as new cellular layers are added to the outer portion of the lens. This layering adds greater pressure to the inner layers of the lens (Weale, 1961). The layering and additional pressure restrict direct blood flow to the lens, thus causing the center of the lens to atrophy and harden (Boettner & Wolter, 1962). The restriction of the blood flow also prevents the removal of waste products creating a yellowing of the lens. This thickening and yellowing of the lens leads to a number of visual problems (Duke-Elder, 1968).

As a result of the yellowing of the lens due to age, adults are less sensitive to short wave length colors (blues and greens). This can be simulated by holding a strip of yellow transparent plastic in front of the eyes and viewing room conditions through it (Fehrman & Fehrman, 2000). Colors from the long wave length of the color spectrum are

easiest to distinguish between (yellows, oranges, and reds) (Fehrman & Fehrman, 2000). One should avoid low contrast in color selections; for example, red dots on pink walls will be read by aging adults as just a pink wall (Fehrman & Fehrman, 2000).

Sensitivity to light declines with age as a result of the diameter of the pupil declining in size with age. The technical term for this condition is senile miosis. The condition is most noticeable to an individual under low lighting levels and lights containing a high blue spectrum (Loewenfeld, 1979).

There is also a decline in visual field with age. Visual field is defined as 60 degrees upward, 70 degrees downward, and 180 degrees horizontally on the line of sight. Although acute perception of fine detail takes place in a small angle that parallels the line of sight, this angle is not greater than 2 degrees in diameter and is generally so small the eye must change position in order to focus successfully to read fine detail, such as both dots of a colon, when viewed at a distance of as little as 14 inches. This appears to affect the functional aspects of visual searches because of the physiological changes in the aging

eye and the ability to find targets in a display. Therefore, thickening of the lens, senile miosis, presbyopia, and poor light color and intensity make it more difficult for older adults to read information in a learning environment (Plude & Hoyer, 1985; Weale, 1961).

Summary

Learning environments include a mix of features which lead to a complex interaction within a learning space. This mix of features includes the visual environment, acoustics, temperature, media use, and room layout (Kirby, 1999; Ledford, 1981). This mix of features can also convey the cultural values of an institution or organization towards learning situations.

Adult learning principles can influence the design of the learning space. In Knowles' program design components, the design and layout of a learning space is listed as the first component to address in the designing of a learning program (Knowles, 1980). The assumptions that andragogy makes about adult learners can be useful for interior designers to consider when designing successful adult learning space (Knowles, Holton, & Swanson, 1998).

CHAPTER 3

METHODOLOGY

Design

This study employed a descriptive research design. Descriptive research tests hypotheses or answers questions concerning participants' current status, and it reports "the way things are" (Gay, 1987, p. 11). In addition, this design is "generally asking questions that have not been asked before" (p. 11). This research described the requests upon interior designers by administrators and faculty related to the design elements of color, lighting, lighting controls, furniture selection, room layout, and finish selection. It also included the designers' perceptions of the servicescape by administrators and faculty and the designers' own approaches to learning space design and their beliefs about the servicescape.

A questionnaire was created to gather information from members of the Association of University Interior Designers (AUID). Membership in this organization requires these

individuals to be interior designers at institutions of higher learning. These institutions include graduate degree granting institutions, 4-year and 2-year colleges, private colleges, and teaching hospitals. The questionnaire was delivered via e-mail through web-based technology for ease of distribution and data collection.

Sample

The group to which the researcher would like the results of the study to be generalized is a population. A population is a cohort of individuals that has an analogous set of characteristics (Gay, 1987, pp. 102-103). The target population for this study was the membership of the Association of University Interior Designers (AUID). This membership is comprised of 77 individuals who are interior designers at institutions of higher learning. The entire membership was asked to participate in the study. Three members were eliminated from the membership. Two in Michigan and Virginia were due to recent retirement. The third member to be eliminated was the researcher. In order to achieve a 50% return rate, the researcher sent two additional reminder emails to AUID members with links to the survey.

A sample is a number of individuals which are selected for a study in such a way that the individuals represent the larger group from which they were selected (Gay, 1987, p. 123). Since the total membership of AUID was selected for the study, the sample was made up of the 39 members which participated in the study. These 39 members constituted 54% of the total population of AUID.

The designers who were surveyed are degreed interior designers/architects who have completed a professional program in interior environments. These individuals are charged with designing spaces in higher education by specifying furniture, interior finishes, color selection, lighting, and physical layouts. The survey was sent to each registered members of the AUID.

Questionnaire

Data were collected by means of a questionnaire that was created and located on the researcher's website. The instrument consisted of questions with responses recorded on a multiple-choice or Likert scale. It gave respondents an opportunity to (a) respond to the requests of faculty and administrators related to design elements; (b) describe the service orientation of faculty, administrators, and

designers; and (c) respond to how designers themselves approach learning space design.

After participants completed the questionnaire, responses were e-mailed to the researcher's website. These were downloaded into a data management file.

Questionnaire Design

The questionnaire contained four parts (see Appendix A). Part 1 contained 10 response items. Part 2 contained 34 response items. Part 3 also contained 34 response items. Part 4 contained 15 response items. The total number of response items was 98.

The first section of the questionnaire dealt solely with demographic information. This information was related to participants' age, sex, level of education attained, design certification, and number of years in the field of design and educational design.

The substance of the survey began in Part 2. This section contained questions about how designers perceived administrator and faculty attitudes toward learning and learning space design at the designer's institution.

Part 3 had questions regarding what administrators and faculty request of designers when planning new space and

renovations of existing learning space. The questions dealt predominantly with the first step of Knowles' program planning and more specifically the physical environment.

Part 4 of the questionnaire contained scenario-style questions which were directed to the designer. These questions were problem based and required the designers to choose responses based on how they would approach learning space design if left to their own devices.

Validity

A simplistic definition of validity queries if the instrument measures what it is supposed to measure (Schutt, 1999). In research using questionnaires, "a too-often-neglected procedure is validation of the questionnaire in order to determine if it measures what it was developed to measure" (Gay, 1987, p. 198). The type of validity most relevant for the questionnaire in this study is construct validity.

Construct validity is "the degree to which a test measures an intended hypothetical construct" (Gay, 1987, p. 131). Construct validity for this instrument was based on questions that relate directly to design factors of the servicescape and to Knowles' first step in the program

planning model (see Table 1). The following table shows how the elements of service and design are related to each other (see Table 1). The chart also indicates which questions are related to elements in the servicescape and elements in the program planning model and elements that include both servicescape and the program planning model. The last column indicates which research question the elements address.

As a means of validating the questionnaire, experts in the field of educational design were used to review the content of questions and the format of the questionnaire. The questionnaire was sent to two university designers in Arkansas in order to assess whether the questions were being used in the right context for learning space design. Based upon feedback from these designers, changes were made that condensed the questionnaire and made it more user friendly. The length of the each section was cut by approximately 30% and some questions were combined to further reduce redundancy in each section. Upon the recommendation of these individuals, questions were held only to items over which designers had direct control.

Those items included furniture selection, color, lighting design, layout, and finish selection. The questions about Heating, Ventilation, and Air Conditioning and sound conditions were removed due to the fact that they are under the control of architects and structural engineers, not the designer.

Electronic Research Issues

Since the introduction of the Internet, the number of users has increased at an extraordinary rate. The United States Department of Commerce (1998) estimates the number of Internet users doubles every 100 days and that by the year 2005, 1 billion people world-wide are expected to be linked to the Internet. In addition, developments in the area of Internet access hardware and software have multiplied exponentially, including the ways in which one can reach users (Stanton & Rogelberg, 2001).

The Internet has proven to be the fastest growing technology in the history of the world (Taylor, 2000). Therefore, it is not surprising that it has generated a growing interest among researchers regarding the feasibility of using the Internet as a means of data collection and conducting educational surveys (Kiesler & Sproull, 1986;

Table 1: Factors of Servicescapes and Knowles Step 1 of Program Planning Model As Related to Questions in Survey Instrument

Servicescape Factors	Servicescape Questions only	Both Servicescape and Knowles Step One	Step 1 of Program Planning Factors	Research Questions
Learning as a Service	Part II, Sect 1, Ques 1-4 Part III, Sect 1, Ques 1-4 Part V Ques 1-4			1,2,3
Layout Style		Part II, Sect 2, Ques 1,7 Part III, Sect 2, Ques 1,7 Part IV, Sect 1, Ques 2,3	Classroom Style	4,5,6
Furniture		Part II, Sect 2, Ques 5,6,7 Part III, Sect 2, Ques 5,6,7 Part IV, Sect 1, Ques 1,2	Furniture	4,5,6
Ambient Conditions			Environment Condit.	
Lighting Intensity		Part II, Sect 2, Ques 3 Part III, Sect 2, Ques 3	Lighting Intensity	4,5,6
Noise		Part IV, Sect 3, Ques 2-5	Noise	4,5,6
Lighting			Lighting	
Color	Part IV, Sect 2, Ques 3	Part II, Sect 2, Ques 4 Part III, Sect 2, Ques 4		4,5,6
Type	Part II, Sect 2, Ques 4 Part III, Sect 2, Ques 4 Part IV, Sect 2, Ques 1			4,5,6
Switching	Part II, Sect 2, Ques 3 Part III, Sect 2, Ques 3 Part IV, Sect 2, Ques 2			4,5,6
Color Selection		Part II, Sect 2, Ques 2 Part III, Sect 2, Ques 2 Part IV, Sect 3, Ques 1	Color Selection	4,5,6
Finish Selection	Part IV, Sect 3, Ques 2-5			6
Visual Consider.			Visual Consider.	
Light Levels		Part II, Sect 2 Ques 3,4 Part III, Sect 2 Ques 3,4 Part IV, Sect 2, Ques 2	Light Levels	4,5,6
Light Color	Part IV, Sect 2, Ques 3			6

Schaefer & Dillman, 1998; Schmidt, 1997; Sproull, 1986; Stanton, 1998).

Today, the Internet is providing new avenues for collecting data and for the dissemination of information via the information highway. This novel and exciting avenue provides researchers a new means of collecting data and information in a more timely and efficient manner (Curasi, 2001; Dillman, 2000; Simsek & Veiga, 2001). The speed at which information is being disseminated in today's social and work force environments demands the employment of fast methods of collecting and returning information in order to keep new ideas fresh (Dillman, 2000; Jones, 1999; Solomon, 2001).

The Internet provides the perfect vehicle to conduct survey research. Researchers can tap the resources of list serves of associations' memberships and quickly contact participants for responses. The participants can complete and return the data electronically with a very fast turnaround time (Simsek & Veiga, 2001; Solomon, 2001). The data can be directly downloaded into a data base and quickly analyzed by the researcher. In other words, there is no time lost due to mailing and repeated mailing of surveys.

Data can be quickly coded, and a cost saving is seen due to the use of list serves and the information highway (Mustanski, 2001).

In the past, researchers have relied heavily on surveys to learn about the experiences of participants in their studies. Therefore, surveys may be the most widely used tool in educational research (Dillman, 2000; Waksberg, 1999; Wiersma, 1995). In quantitative research, surveys are the most basic form of collecting data. Many times, these surveys are descriptive in nature but may require very careful thought and are time intensive when designing (Dillman, Tortora, & Bowker, 1998; Leedy, 1997). Studies using survey research require that the population be carefully chosen and clearly defined with distinct limits and as little distortion as possible (Dillman, Tortora, & Bowker, 1998). Survey research requires that data be meticulously organized and communicated in a scrupulous manner so that accurate conclusions can be presented.

Surveys are not always perfect; they do present some shortcomings. These shortcomings can include a myriad of circumstances such as sampling procedure breakdowns, poorly constructed questionnaires, failure to provide adequate

follow-up, difficulties in assembling and tabulating data, inefficiency in the return of questionnaires, non-response to some questions, failure to allow enough time to complete the study, and inappropriate generalization of data (Dillman, 2000; Wiersma, 1995).

Previously, the most common method of data collection when using surveys has been the use of mail (Dillman, 1978, 2000; Leedy, 1997; Waksberg, 1999; Wiersma, 1995). One problem which persists with mail surveys is that of a high non-response rate, which in turn introduces bias into the study (Waksberg, 1999; Wiersma 1995). To help counteract high non-response rate, researchers typically mail advance letters or post-cards to entice participation. Later the survey is sent with a cover letter and a stamped return envelope. Once the first round of surveys has been received, a follow-up letter is sent to non-responders reminding them of the importance of their participation in the study (Dillman, 1978, 2000). Many times, in order to increase the response rate, researchers offer participants results of the completed study. By using this method for surveys, many factors such as multiple mailings, printing, cost of mailing list, and return postage can make the

process time consuming and expensive (Dillman, 2000; Furlong, 1997; Leedy, 1997; Wiersma, 1995).

The Internet is providing a faster route for researchers to conduct surveys (Simsek & Veiga, 2001). As Internet usage expands, it will help reshape research in higher education. As its use increases, web-based research will also increase in importance (Gilbride & Stensrud, 1999; Simsek & Veiga, 2001).

With the increased popularity of the Internet among researchers, an increasing trend towards moving away from traditional mail surveys can be seen (Waksberg, 1999). Over the last few years, the use of the Internet for collecting survey data has been on the increase (Dillman, Tortora, Conradt, & Bowker, 1998). Primary industries using the Internet for data collection are in the areas of business and health. As the Internet is increasingly used for research, new methods can be developed to provide for improved effectiveness in the collection of data, and these can result in time savings (Dillman, Tortora, & Bowker, 1998; Drake & Rudner, 1995).

Many times, the participants in a study involving Internet data collection are notified via electronic mail

(e-mail). E-mail is defined as messages composed on the computer and sent via a modem and Internet to another person who has a means of receiving the message (Gilbride & Stensrud, 1999). Participants are often recruited to participate due to their membership in an organization or group. These groups use listserves to inform members of updates or news of events in the organization via e-mail. Often researchers will ask to use or will buy rights to a listserve to contact group members (Dillman, 2000).

The Internet has several advantages for use in adult education research. The Internet exhibits the capacity to increase communication with faster response times than regular mail, a quicker turnaround of information, and a greatly reduced cost. The Internet gives users greater access to information and research materials for information gathering and a potential for greater competency (Solomon, 2001).

Many Internet-based research projects can be conducted with few, if any, related expenses. The primary costs of Internet surveys include assembling and obtaining sampling listserves, creating or buying software and supporting databases, and accessing the Internet (Mehta & Sivadas,

1995). Because most universities provide free web hosting for affiliated individuals, the server used for data collection may be cost free. Furthermore, costs associated with the other techniques tend to be proportional to the size of the sample, making the cost associated with adding additional respondents in Internet surveys relatively low (Simsek & Veiga, 2001). If increased control or security is desired, most personal computers can be used as web servers with the addition of inexpensive software.

The advent of easy-to-use web-site design software allows researchers themselves to create web sites for most survey studies without having to hire computer programmers. Internet surveys do not require the use of paper at any stage and simplify data analysis by a direct transfer from the form to analysis software where limited data cleaning would be necessary. The outflows related to printing, mailing, or coding can be eliminated by having data automatically entered into a database (Dillman, 2002; Mustanski, 2001). The downside to utilizing university resources is that there may not be people available who are knowledgeable enough about the Internet to consider ethical

and methodological issues with this research (Mustanski, 2001).

Another attractive feature of conducting research via the Internet is the ease with which the data are collected. Because participants conduct the study on their own computer whenever they desire, there is no need for scheduling time with participants, hiring interviewers and coders, or spending time conducting the research. Once the study is set up, participants can complete the study any time of day or night without any further contact by the researcher (Dillman, 2000; Mustanski, 2001).

Internet surveys offer the advantage of very rapid surveying, a feature that has been well documented in past research (Kittleson, 1995; Mehta & Sivadas, 1995; Sproull, 1986). Many existing survey techniques, including facsimiles, cannot provide researchers with such speed in reaching specified individuals. An Internet survey can be sent as easily to a thousand people as it can to one. All potential respondents can immediately receive the questionnaire regardless of the location. Swoboda, Muhlberger, Weitkunat, and Scheneeweib (1997) reported that they were able to send 8,859 questionnaires to randomly

selected respondents via email in a single day. Moreover, Mehta and Sivadas (1995) reported that they received half of their email responses in just 3 days compared with 3 weeks to receive a comparable number of postal survey responses. The use of data collection by the use of Internet surveys has been conducted in the Human Resources and Adult Education program at Oklahoma State University. The dissertations of Ghostbear (2001), Hughes (2002), O'Brien (2001), and Geib (2002) have greatly benefitted from the use of this technique both in cost and time. Additional time savings can also be realized when the research design calls for more than one contact with respondents, such as sending follow-up questionnaires (Dillman, 2000).

Although Internet surveys are becoming a popular trend in educational and other research realms, researchers must consider ways to prevent low response rates and bias in their studies. One such way is to consider the design of the survey itself. Internet users are less likely to participate in surveys if they have to navigate around voluminous amounts of information which makes them less tolerant toward material that is not of interest to them (Simsek & Veiga, 2001). In a recent study, Dillman,

Tortora, Conradt, and Bowker (1998) found that Internet surveys that were plain in design and which presented few questions per page had higher response rates and fewer unanswered questions. This study used a single page format with a single colored background, bold text, and easy point-and-click bullets.

There are many other steps which can be taken to improve the response rate on a survey. It may prove beneficial to notify the group of the incoming questionnaire through e-mail a week before the survey is sent (Emery, 1995; Mehta & Sivadas, 1995). In postal surveys, advanced notice positively influences response rates across settings and populations (Yu & Cooper, 1983). Prior notification was sent to the population for this study to seek their participation. This notification also included (a) a social appeal that emphasizes the worthiness of the survey, (b) an egotistic appeal that stresses the respondents' place and importance in completing the survey, and (c) an appeal to help the researcher in completing an important project. Also included in the notice were the researcher's name and contact numbers, other university officials to contact for questions, expected date of the survey, and a statement

indicating the strict confidentiality of the respondent's response. This was intended to help respondents feel comfortable in participating in the survey. To keep this trust, the researcher also included steps that would be taken toward ensuring anonymity and confidentiality in the announcement letter (Goree & Marszalek, 1995).

The second step in ensuring higher response is the use of follow-up e-mail. The underlying argument here is that properly timed follow-up mailings provide additional stimuli for responding (Dillman, 2000). This hypothesis is supported by the literature on postal surveys, which strongly suggests that follow-up mailings are an effective means of increasing response rates (Salant & Dillman, 1994). Additional empirical evidence supports the observation that follow-up emailing can be an effective method of augmenting responses to Internet surveys. For example, the first mailing in a study by Schleyer, Forrest, Kenny, Dodell, & Dovgy (1999) brought the total response of 32.9%, and the second mailing increased the total response to 57.1%. In the current study, a follow-up mailing was sent which included a hot link to the researcher's site in the event the first email was deleted or lost.

The third step is to employ an incentive to increase responses. Church (1993), in a meta-analysis of the effects of incentives on mail survey response rates, indicated that prepaid incentives, either monetary or nonmonetary, had a significant effect on response rates. Having an individual complete a survey on the Internet is essentially a manifestation of helping behavior. It is about asking strangers to donate some of their resources in the form of time and to release some personal information that they may prefer to keep private. Within this context, it is logical to offer the respondents some incentive to augment their cooperation (Cho & LaRose, 1999). In this study, respondents were offered a chance to review the findings and the presentation of the findings at their next association meeting if they so desire.

The final and most critical factor is the questionnaire layout and design. Internet surveys should be accompanied by very clear and simple instructions, such as how to reply to questions without consuming much of the respondents' time and cognitive abilities (Dillman, 2000). In particular, extra features that would minimize questionnaire completion time and maximize respondent convenience should be pursued.

Such techniques employed in this survey included scrolling, point and click, and few keyboard responses.

One should use simple graphics instead of devices and features that consume enormous amounts of memory and make opening such messages time-consuming and frustrating if the respondent's computer is limited in terms of power, memory, connection, speed, and web browser. In addition, graphics, sound effects, and special formatting of the questionnaire may not translate across various e-mail and browser packages. To solve such problems, the instrument was tested thoroughly to reduce the number of software defects and incompatibilities and to ensure that the formatting and the appearance of the questionnaire remained the same after transmission as recommended by Tse (1998). Simple graphics were used as separators between the different sections of the survey.

It has also been suggested that the survey use no more than 15 to 20 minutes of the respondents time in order to increase the number of responses (Dillman, 2000). One must remember the researcher is asking respondents to donate their time. If surveys take too much time to complete, respondents may simply decide not to participate (Simsek &

Veiga, 2001). This survey was designed to only use 10 to 15 minutes of the participant's time.

Other issues of concern when collecting data via the Internet include anonymity of participants, security of data, and confidentiality (Dillman, 2002; Mustanski, 2001; (Simsek & Veiga, 2001; Stanton & Rogelberg, 2001). The issues of anonymity and security are particularly important in the Internet environment in which people have potential access to one another's personal information. Therefore, when conducting Internet surveys, the researcher's primary task should be safeguarding participants' information as well as taking steps to alleviate participants' anonymity concerns (Simsek & Veiga, 2001). Unfortunately, in networked research, regardless of the technological sophistication, it is a difficult and daunting task to guarantee the anonymity of respondents who might be hesitant to participate.

To help ensure participants of anonymity, researchers can use software that strips the respondent's identity information from the response and places it in a separate file so that when follow-up reminders are sent those who have completed the survey are not sent the follow-up

message. This process should be stated in the cover letter to relieve any concerns of anonymity and increase response rates (Cho & LaRose, 1999; Simsek & Veiga, 2001). This study provided anonymity for the respondents by using an e-mail with a link to the website. With this approach, users can be linked to the website anonymously. By this method the research does not know who responded and who did not respond to the survey, thus protecting the participants' anonymity and privacy.

Researchers must provide measures for data security such as using servers with fire walls, security passwords, and programs used for data bases which store the data and participants' information. The employment of security software will also enhance the security of the information. The researcher should also devise a plan of how to store and destroy any printouts of the information related to participants and their responses (Simsek & Veiga, 2001).

CHAPTER 4

FINDINGS

Introduction

Information gathered from 39 members of the Association of University Interior Designers served as data for this study. Specifically, quantifiable data provided by the survey instrument were used to provide information about perceptions of requests of interior designers by faculty and administrators regarding learning space design and about the views of their institution as a service provider or education provider. Data were also collected on how designers would approach learning space design if designers had no preferences given by faculty and administrators.

Profile of University Interior Designers

The sample is representative of both education interior design and the general interior design industry population with respect to gender, race, education, and age (see Table 2). Gender composition of the 39 participants was 36 female and 3 male. Participants' ages ranged from 28 to 62 years

Table 2. Frequency of Demographic Variables

Variable	Frequency	Percent
Gender		
Female	36	92.3
Male	3	7.7
Education		
Bachelors	33	84.6
Masters	6	15.4
Type of Institution		
4-year Institution	19	48.7
Graduate Institution	16	41.0
Private Institution	2	5.1
Community College	1	2.6
Teaching Hospital	1	2.6
Department Affiliation		
Architecture/Design Services	15	38.5
Facilities Management	9	23.1
Other	7	17.9
Physical Plant Services	6	15.4
Purchasing	2	5.1
Ethnicity		
Caucasian	35	89.6
African American	1	2.6
Hispanic	1	2.6
Native American	1	2.6
Non-respondent	1	2.6

of age with 44-years of age as the mean and 45-years of age as the median. Participants' educational background included 27 females and 3 males with bachelors degrees and 6 females with master's level degrees. This is consistent with age and level of education in the United States across the industry (Banks, 2004). Years of design practice ranged from 5 to 30 years with a mean of 18.15 and a median of 20.00 years. Years in educational design ranged from 1 to 28 with a mean of 11.91 and median of 13.00 years. Years of teaching experience ranged from 2 to 3 years with only 4 participants having taught in the classroom.

The 39 university interior designers that participated in this study were predominantly Caucasian females. A cross tabulation of gender and race demonstrates that 92% were Caucasian females. This is consistent with demographic variables across the industry, which indicate that approximately 87% of interior designers are female and Caucasian (T. Banks, personal communication, April 14, 2004).

The Association of University Interior Designers has 77 members in 19 states. Of these 19 states, members of 16 states responded. Thus, 81.6% of the states were

represented in the sample, and 52.8% of the memberships were represented in the sample (see Table 3).

Table 3. Distribution of Participants by State

State	Participants	Percentage	Total AUID Membership	Percentage of AUID
FL	0	0	1	1
IA	3	7.7	6	8
ID	0	0	1	1
IL	0	0	1	1
IN	5	12.8	12	16
KS	1	2.6	1	1
KY	1	2.6	5	7
MA	0	0	1	1
MI	4	10.3	10	14
MO	5	12.8	8	11
MS	1	2.6	1	1
NC	1	2.6	2	3
NY	4	10.3	5	8
OH	5	12.8	8	11
OK	2	5.1	2	3
PA	1	2.6	3	4
TN	1	2.6	1	1
TX	3	7.7	4	6
VA	1	2.6	1	1
WA	1	2.6	1	1
Total	39	100	74	100

Service Orientations

When designing learning space, it is important to understand how the role of an educational institution is perceived by the administrators, faculty, and designers. Is education a service provided by the institution, or does the institution just provide education? This perception plays an important role in how much emphasis is placed on learning space design. If administrators, faculty, and designers feel that learning is a service provided by the institution, then the design of learning space, or the servicescape, should be very important to all parties involved. As in the case with restaurants, stores, or banks, servicescapes of adult learning space should entice customers to return and use the services provided (Bitner, 1986, 1992; Ward, Bitner, & Barns, 1992).

The designers' perceptions of whether administrators and faculty considered their institutions to just provide education or to provide education as a service were equally matched. The respondents perceived that both administrators and faculty alike strongly agreed that their institution not only was a provider of education but also provided education as a service. When designers were given the same question

regarding their own perceptions of whether their institution was a provider of education or if education was provided as a service, the responses were the same as for the faculty and administrators perceptions.

Perceptions of Design of Learning Space

When one is approaching a space to design, it is important to understand the emphasis others place on the importance of the space design (Bitner, 1990; Knowles, 1990; Long, 1987; Torbert, 1987). Designers were asked to respond to their perceptions regarding the focus of administrators and faculty on the importance of learning space design. In this case, the respondents' perception that their administrators view classroom design as being important on their campus was as follows: 36.9%--Strongly Agree, 47.2%--Somewhat Agree, and 15.9%--Neutral. On the other hand, designers' perceptions of faculty attitude is somewhat divergent to that of administrators. They perceived the faculty's views that classroom design is important on their campus as follows: 54.3%--Strongly Agree, 39.5%--Somewhat Agree, and 6.2%--Neutral. When designers responded about their own perceptions of learning space design, 92.3% strongly agreed and 7.7% somewhat agreed that learning space

design is important. This is in sharp contrast to the perceptions of administrators and faculty.

Consultation of Others When Designing

When designing any space, it is important to solicit information on the intended use of the space and about the desires from the end users in order to provide an effective design program. Designers' perceptions of when administrators and faculty consult others concerning the design of space differed. The respondents strongly agreed 46.2% of the time that administrators consult with others on space design. However, this number dropped to 30.8% for faculty soliciting input from others about learning space design. When designers were asked about their willingness to solicit input from others when designing learning space, 74.4% strongly agreed on the importance of this function for providing an effective design program for learning space.

Administrator and Faculty Request of Design Elements

Frequently the type of design used at a particular institution of higher learning is dependent upon input and preferences of administrators and faculty. Designers may or may not agree with the type of design being implemented. The following indicates participants' perceptions regarding

what administrators and faculty request of designers in renovation and development of learning spaces.

Seating Style

When designing adult learning space, designers are confronted with differing types of seating to use with the space (see Table 4). Some common types of seating, which are requested by administrators and faculty, are auditorium, fixed desk, moveable desk, and tables and chairs (American School & University, 1998). The results of these requests show that interior designers are asked to design adult learning space with auditorium and fixed desk seating about one-third of the time by both administrators and faculty at educational institutions. Designers were requested to use movable desks Somewhat to Most Often 85% of the time by administrators and 79% by faculty. The administrators' requests were as follows: Somewhat Often--31%, Very Often--31%, and Most Often--23%. The faculty's requests were as follows: Somewhat Often--26%, Very Often--40%, and Most Often--13%. The use of tables and chairs in designs are also highly requested of designers 87% of the time by administrators and 79% by faculty. The administrators' requests were as follows: Somewhat Often--33%, Very Often--

39%, and Most Often--15%. The faculty's requests were as follows: Somewhat Often--28%, Very Often--33%, and Most Often--18%. In the distribution, the request for the use of auditorium style and fixed desk seating are distributed about equally on both sides of neutral. Auditorium and fixed desks were requested slightly more for usage than not. The requests of the faculty and administrators were highly correlated for all four seating styles: moveable desk ($r=.587$, $n=36$, $p=.003$), tables and chairs ($r=.691$, $n=36$, $p=.001$), auditorium ($r=.494$, $n=37$, $p=.002$), and fixed desk ($r=.565$, $n=37$, $p=.001$). Moveable desks and tables and chairs seating styles are useful for creating a learning environment that allows learners and facilitators to easily re-arrange furnishings to meet the needs of a particular class (American School and University, 1998; Blackett & Standfield, 1994; Keown, 1999; Muller, Probasco, & Schuh, 1985; Owu, 1992; Rath & Ittleson, 1981; Tessmer & Harris, 1992).

Table 4: Frequency of Seating Style Responses

Item	Never	Almost Never	Least Often	Neutral	Some- what Often	Very Often	Most Often
Faculty							
Auditorium	1	11	8	3	12	2	0
Fixed desk	5	4	10	4	12	2	0
Movable desks	2	2	2	1	9	15	5
Table and Chair	1	0	3	1	11	13	7
Administrators							
Auditorium	2	4	10	6	12	5	0
Fixed desk	3	3	12	6	12	1	2
Movable desks	1	0	5	0	12	12	9
Table and Chair	0	2	1	2	13	15	6

Furnishings

Providing furnishings with adequate work surface and comfortable seating is important in adult learning space (Gorham, 1981). These furnishings can vary from chair-desk with moderate work surfaces to tables and comfortable chairs (see Table 5). Chair desk and chairs used with tables can have varying degrees of comfort and support depending on the design (Caffarella, 1994; Markel, 1999; Owu, 1992; Torbert, 1987). Designers were requested to use desks with moderate writing surfaces Somewhat to Most Often 64% of the time by

administrators and 54% of the time by faculty. The administrators' requests were as follows: Somewhat Often--23%, Very Often--31%, and Most Often--10%. The faculty's requests were as follows: Somewhat Often--31% and Very Often--23%. Designers were requested to use small tables and comfortable chairs Somewhat to Most Often 70% of the time by administrators and 80% by of the time faculty. The requests for this type of furnishings was higher than the other types in this category. The administrators' requests were as follows: Somewhat Often--36%, Very Often--28%, and Most Often--6%. The faculty's requests were as follows: Somewhat Often--39%, Very Often--36%, and Most Often--5%. Designers were requested to use tables and comfortable chairs for grouping Somewhat to Most Often 46% of the time by administrators and 54% by faculty. The administrators' requests were as follows: Somewhat Often--33% and Very Often--13%. The faculty's requests were as follows: Somewhat Often--28% and Very Often--26%. The requests of the faculty and administrators were highly correlated for all three furnishing selections: chair desks ($\underline{r}=.744$, $\underline{n}=37$, $\underline{p}=.001$), small tables and chairs ($\underline{r}=.556$, $\underline{n}=37$, $\underline{p}=.001$), and tables and chairs for groupings ($\underline{r}=.608$, $\underline{n}=37$, $\underline{p}=.001$).

Table 5: Frequency of Furnishing Responses.

Item	Never	Almost Never	Least Often	Neutral	Some- what Often	Very Often	Most Often
Faculty							
Chair desk	3	5	8	1	11	9	1
Tables and Comfortable Chair	1	1	0	4	13	14	4
Tables for Groupings	3	3	7	3	11	10	0
Administrators							
Chair desk	3	5	4	2	9	12	4
Tables and Comfortable Chair	1	1	7	3	14	11	2
Tables for Groupings	3	13	4	1	13	5	0

Layout: Fixed versus Flexible

The layout of furnishings with respect to being fixed or flexible plays an important role in adult learning space design. Fixed furnishings are mechanically fastened and are unable to be moved within the space, whereas flexible furnishings are easily moved to reconfigure the space (Markel, 1999).

Designers were requested to use flexible over fixed designs Somewhat to Most Often 95% of the time by

administrators and 87% by faculty (see Table 6). The administrators' requests were as follows: Somewhat Often--18%, Very Often--44%, and Most Often--33%. The faculty's requests were as follows: Somewhat Often--23%, Very Often--36%, and Most Often--28%. However, designers were requested to use fixed designs Somewhat to Most Often 25% of the time by administrators and 23% by faculty. The administrators' requests were as follows: Somewhat Often--15% and Very Often--10%. The faculty's requests were as follows: Somewhat Often--18% and Very Often--5%. The requests of the faculty and administrators were highly correlated for fixed versus flexible: flexible ($r=.411$, $n=35$, $p=.014$) and fixed ($r=.629$, $n=36$, $p=.000$).

Table 6: Frequency of Layout Type Responses.

Item	Never	Almost never	Least Often	Neutral	Some-what Often	Very Often	Most Often
Administrators							
Fixed	8	9	9	3	6	4	0
Flexible	0	0	1	0	7	17	13
Faculty							
Fixed	9	6	12	0	7	2	0
Flexible	0	0	1	1	9	14	11

Layout: Room Arrangement

For room arrangement, tables in rows with comfortable chairs are most popular (see Table 7). Designers were requested to use tables in rows with comfortable chairs Somewhat to Most Often 71% of the time by administrators and 72% of the time by faculty. The administrators' requests were as follows: Somewhat Often--56% and Very Often--15%. The faculty's requests were as follows: Somewhat Often--54% and Very Often--18%.

Groupings of tables and comfortable chairs were the second most requested in the room arrangement category (see Table 7). Designers were requested to use groupings of tables and comfortable chairs Somewhat to Most Often 60% of the time by administrators and 79% of the time by faculty. The administrators' requests were as follows: Somewhat Often--26%, Very Often--26%, and Most Often--8%. The faculty's requests were as follows: Somewhat Often--40%, Very Often--21%, and Most Often--18%.

Layouts with desks facing the front of the room are still a popular choice (see Table 7). Designers were requested to use layouts with desks facing the front of the

room Somewhat to Most Often 62% of the time by administrators and 44% of the time by faculty. The administrator's requests were as follows: Somewhat Often--26%, Very Often--28%, and Most Often--8%. The faculty's requests were as follows: Somewhat Often--26%, Very Often--15%, and Most Often--3%.

Designers were requested to use conference style layouts Somewhat to Most Often 56% of the time by administrators and 56% by faculty (see Table 7). The administrators' requests were as follows: Somewhat Often--44% and Very Often--12%. The faculty's requests were as follows: Somewhat Often--41%, Very Often--12%, and Most Often--3%.

Having space arranged in a circular layout was the least popular design choice (see Table 7). Designers were requested to use circular layouts Somewhat to Most Often 29% of the time by administrators and 39% by faculty. The administrators' requests were as follows: Somewhat Often--26% and Very Often--3%. The faculty requests were as follows: Somewhat Often--33% and Very Often--6%. The requests of the faculty and administrators were highly correlated for room arrangements: desks facing the front of

the room ($\underline{r}=.612$, $\underline{n}=35$, $\underline{p}=.014$), circular layout ($\underline{r}=.712$, $\underline{n}=37$, $\underline{p}=.001$), tables in rows with chairs ($\underline{r}=.540$, $\underline{n}=36$, $\underline{p}=.001$), conference ($\underline{r}=.599$, $\underline{n}=36$, $\underline{p}=.001$), and groupings of tables and chairs ($\underline{r}=.663$, $\underline{n}=36$, $\underline{p}=.001$).

Table 7: Frequency of Room Arrangement Responses.

Item	Never	Almost Never	Least Often	Neutral	Some- what Often	Very Often	Most Often
Administrators							
Desks Facing Front	4	3	8	0	10	11	3
Circular	7	10	11	0	10	1	0
Tables in rows	1	4	3	1	22	6	2
Conference	1	3	10	3	17	5	0
Groupings of Tables & Chairs	0	3	8	4	10	10	3
Faculty							
Desks Facing Front	6	3	9	2	10	6	1
Circular	5	8	7	2	13	2	0
Tables in rows	1	1	4	2	21	7	0
Conference	0	4	7	3	16	5	1
Groupings of Tables & Chairs	1	4	0	3	14	8	7

Color

Color selection plays an important role in designing

learning space. Color can evoke emotions and create certain behaviors within a space (Hawkins, 1991; Mahnke, 1981; Pile, 1995; Trinkaus, 1991). Administrators and faculty may make requests dealing with types of color schemes to be used in classroom design. However, about one-third of the time faculty and administrators showed no preference for color scheme selection in classroom design (see Table 8). When a preference was given, it was higher for warm neutral color, cool color, cool neutral color schemes, and a combination of cool and warm neutral color schemes.

Lighting Design

Color also is dependent on the lighting design used in the learning space. The type of lamp selection plays an important role in the way the human eye reads color within a space (Michel, 1996). The typical selections used in classroom designs are incandescent, fluorescent, low-voltage, and high intensity-discharge (HID) (Gorden & Nuckolls, 1995; Rea, 2000; & Ward, 1991).

Designers were requested to use fluorescent lamps Somewhat to Most Often 97% of the time by administrators and 46% by faculty (see Table 9). The administrators' requests

Table 8: Frequency of Color Schemes Responses.

Item	Never	Almost Never	Least Often	Neutral	Some- what Often	Very Often	Most Often
Administrators							
Warm	5	4	6	15	4	5	0
Cool	3	3	3	14	12	3	1
Combo. Of warm/cool	3	4	3	19	7	1	2
Warm Neutral	3	2	1	10	9	12	2
Cool Neutral	3	1	5	16	12	2	0
Combo. Of Cool/Warm Neutrals	3	2	4	14	9	5	1
Faculty							
Warm	2	3	3	15	8	3	2
Cool	1	1	4	16	7	5	2
Combo. Of warm/cool	2	1	3	20	7	2	1
Warm Neutral	1	1	3	15	8	8	1
Cool Neutral	1	2	7	19	4	4	0
Combo. Of Cool/Warm Neutrals	1	0	5	19	7	4	0

were as follows: Somewhat Often--10%, Very Often--31%, and Most Often--55%. The faculty's requests were as follows: Somewhat Often--15%, Very Often--18%, and Most Often--13%. When correlating requests by administrators and faculty of

designers for fluorescent lamps, the responses are not correlated ($\underline{r}=.132$, $\underline{n}=37$, $\underline{p}=.438$) but are very different.

The selection of incandescent lamps were the reverse from fluorescent lamps when comparing faculty and administrators' responses. Designers were requested to use incandescent lamps Somewhat to Most Often 23% of the time by administrators and 44% of the time by faculty. The administrators' requests were as follows: Somewhat Often--15%, Very Often--5%, and Most Often--3%. The faculty's requests were as follows: Somewhat Often--23%, Very Often--18%, and Most Often--3%. Administrators and faculty differed in their requests for incandescent lamps ($\underline{r}=.168$, $\underline{n}=37$, $\underline{p}=.319$). The requests of low-voltage and HID lamps was very low with only 28% of administrators and 8% of faculty requesting low voltage lamps from Most Often to Somewhat Often. Likewise, only 8% of administrators and 5% of faculty requested HID lamps from Most Often to Somewhat Often. The requests of the faculty and administrators were highly correlated for the following lamps: Low voltage lamps ($\underline{r}=.502$, $\underline{n}=36$, $\underline{p}=.002$) and HID lamps ($\underline{r}=.693$, $\underline{n}=37$, $\underline{p}=.001$).

Table 9: Frequency of Lamp Types Responses.

Item	Never	Almost Never	Least Often	Neutral	Some- what Often	Very Often	Most Often
Administrators							
Incandescant	9	7	10	3	9	1	0
Flourescent	0	0	0	1	4	12	22
Low-Voltage	3	8	12	4	8	2	1
HID	11	14	5	6	2	1	0
Faculty							
Incandescant	1	3	9	7	9	7	1
Flourescent	0	1	3	9	6	13	5
Low-Voltage	10	7	5	12	3	0	0
HID	14	9	1	11	2	0	0

Switching

The type of switching employed for lighting distribution can enhance or detract from any lighting application. The switching for lighting can hinder learning activities if it does not allow for light levels to be adjusted to meet the needs of a presentation or activity within the learning space (Grant, 1991; Rea 2000).

Designers were requested to use designs employing multi-switching solutions Somewhat to Most Often 85% of the

time by administrators and 90% of the time by faculty (see Table 10). The administrators' requests were as follows: Somewhat Often--26%, Very Often--31%, and Most Often--28%. The faculty's requests were as follows: Somewhat Often--21%, Very Often--51%, and Most Often--18%. The use of dimmable switching in adult learning space was preferred slightly more by faculty than by administrators. Designers were requested to use dimmable switching solutions Somewhat to Most Often 75% of the time by administrators and 71% of the time by faculty. The administrators' requests were as follows: Somewhat Often--26%, Very Often--39%, and Most Often--10%. The faculty's requests were as follows: Somewhat Often--23%, Very Often--38%, and Most Often--10%. The use of single on/off is rarely requested for lighting design (19% for administrators' requests and 18% for faculty requests), whereas preset scenes are requested about one-fourth of the time (27% for administrators' request and 25% for faculty request). The requests of the faculty and administrators were highly correlated for switching: single switching ($r=.427$, $n=35$, $p=.011$), multi-switching ($r=.421$, $n=37$, $p=.009$), dimmable switching ($r=.511$, $n=37$, $p=.001$), and preset scenes switching ($r=.718$, $n=37$, $p=.001$).

Table 10: Frequency of Switching Design Responses.

Item	Never	Almost Never	Least Often	Neutral	Some- what Often	Very Often	Most Often
Administrators							
Single on/off	9	12	7	3	4	1	3
Multi	1	0	0	1	10	16	11
Dimable	1	1	6	2	10	15	4
Preset scenes	6	7	8	7	7	2	1
Faculty							
Single on/off	7	12	5	6	4	0	3
Multi	0	0	0	2	8	20	7
Dimable	0	2	2	5	9	15	4
Preset scenes	6	7	8	7	7	1	1

Preferences of Interior Designers

Interior designers were asked about their preferences for designing adult learning spaces in a scenario format. The first scenario dealt with the administrator of an adult continuing education center on the designer's campus requesting help selecting furnishings and providing a furniture layout for newly finished space in the center. In this scenario, designers were asked to give their preferences for fixed or flexible furniture designs and to

select furnishings from a list of popular furnishings frequently used on college campuses. This list of furnishings included: chair desks with standard writing surfaces, small tables and comfortable chairs, or differing sized tables for grouping and comfortable chairs.

Designers overwhelmingly chose to provide flexible designs by selecting furnishings in two categories (see Table 11). With respect to furniture selection, small tables and differing sized tables for grouping with comfortable chairs accounted for 48.7% of the responses. Differing sized tables for grouping and comfortable chairs accounted for 46.2% of the responses.

Table 11: Distribution Of Interior Designers' Preferences for Furnishings.

Item	Frequency	Percent
Small tables and comfortable chairs	19	48.7
Differing sized tables for grouping and comfortable chairs	18	46.2
Chair desk with standard writing surfaces	2	5.1

Designers were also given the opportunity to select how to layout the furnishings with the adult learning space once they had selected the furnishings. In keeping with the

previous results for preferences, flexibility was preferred by 49.7% of the respondents, who preferred designs that employed groupings of tables and chairs. Another 21.1% preferred tables arranged conference style. This accounts for 70.8% of responses, supporting the idea of having space that is learner centered and demonstrating the designers' desire to create spaces with flexible furnishings (see Table 12).

Table 12: Distribution Of Interior Designers' Preferences for Furnishing Layout.

Item	Frequency	Percent
Groupings of tables and chairs within the space	19	49.7
Tables arranged conference styles with users facing each other	8	21.1
Tables in long rows all facing the front of the room	7	18.9
Desks in a fixed arrangement of rows facing the front of the room.	3	7.7
Desks in a circular fashion with users facing the center of the room	1	2.6

Another scenario presented designers with the prospect of replacing lighting systems in four classroom of an adult learning center on their campuses. The designers were told the center used the classrooms for large and small group discussion, for multimedia presentations, and for

presentations to large groups by industry. The survey had three response questions. The first part asked designers to choose lamp types for the learning space. These lamp types included incandescent, fluorescent, low-voltage, HID, and various combinations of these lamps.

Despite the large number of options, all of the responses were in two categories. Three-fourths (74.4%) of the respondents selected combinations of incandescent, fluorescent, and low-voltage lamps. The other one-fourth (25.6%) of the participants chose fluorescent lamps.

Another issue faced by designers when choosing lamps is color rendering quality and color cast by the lamps (Goodman & Smith, 1992; Pile, 1995, Rea, 2000; Weishar, 1992). This is especially so when choosing fluorescent and HID lamps. Lamps are rated by the whiteness of color the lamps cast when they are on. The classification of this light color is considered to be cool white, warm white, and soft white light.

Designers have a 46.2% preference for warm white light and a 35.9% preference for a soft white light in a learning space. Only 17.9% of the designers would mix both cool and warm white light together (see Table 13). The choice of

warm white light and soft white light helps promote activity in space and helps make a space look and feel pleasing to the user (Grant, 1991).

Table 13: Distribution Of Interior Designers' Preferences for Light Color.

Item	Frequency	Percent
Warm White Light	18	46.2
Soft White Light	13	35.9
Combination of cool and warm light	7	17.9
Cool White Light	0	0

Once designers have chosen lamps, lamp color, and placement of lighting fixtures for a learning space, a decision concerning light switching must be made. Designers must decide if the space's lighting design needs a single on/off switch, multiple on/off switching, dimmable switching, or pre-set scenes that can be adjusted as the room functions change over time (Flynn, Kremmers, Segil, & Steffy, 1992; Rea, 2001). Preferences for multi-switching and dimmable switching were equal with 41% of designers choosing each. Only 18% of the designers chose adjustable pre-set scenes (see Table 14).

Table 14: Distribution Of Interior Designers' Preferences for Switching.

Item	Frequency	Percent
Multi-switching	16	41
Dimmable switching	16	41
Adjustable pre-set scenes	7	18
One On/Off Switch	0	0

Designers create a space's servicescape through the uses of color, type of finishes, and textures they select for a given space (Bitner, 1990; Kirby, 1999; Ledford, 1981). The selection of color can have a significant impact on the user within a space (Hawkins, 1991; Pile, 1995). Color can affect one's emotions, levels of conciseness, and behavior (Choungourian, 1972; Mahnke, 1981; Pile, 1995).

Combinations of color schemes are preferred by designers when designing learning spaces (see Table 15). Color schemes of warm and warm neutral colors are preferred by over one-third (38.5%) of the respondents whereas combinations of warm and cool color schemes are preferred by one-fourth (25.6%) of the respondents. Only one-eight (12.8%) of the respondents preferred the use of cool colors or combinations of cool and cool neutral color schemes.

Table 15: Distribution Of Interior Designers' Preferences for Color Schemes.

Item	Frequency	Percent
Combination of warm and warm neutral color schemes	15	38.5
Combinations of Warm and Cool Color Schemes	10	25.6
Warm Neutrals Color schemes	8	20.5
Cool Color Schemes	3	7.7
Combination of Cool and Cool-Neutral Color Schemes	2	5.1
Warm Color Schemes	1	2.6
Cool Neutral Color schemes	0	0

Designers must consider texture in the learning environment. Texture effects acoustic qualities and reflectiveness of materials in a space. Texture can be added to a space through the use of carpet, textured vinyl wall coverings, fabric window coverings, and textured ceiling panels. A combination of smooth, hard, textured finishes, and of finishes using wall paper were preferred by over half (58.6%) of the respondents whereas about one-third (30.8%) of the respondents preferred smooth hard finishes (see Table 16).

Table 16: Distribution Of Interior Designers' Preferences for Texture.

Item	Frequency	Percent
Combination of smooth, hard and textured finishes	13	33.3
Smooth, hard Finishes	12	30.8
Combination of smooth, hard, textured and wall paper.	10	25.6
Textured Finishes	3	7.7
Wall paper (Type II Vinyl)	1	2.6
Wood Paneling	0	0

When selecting these finishes, designers must give consideration to the ease of cleaning the finish. This is a major consideration on college campuses due to the frequent turnover and shortages in cleaning staffs. In order to keep a space looking clean and fresh, smooth hard finishes can be used for quickness of cleaning and durability (Allen, Stimpson, & Jones, 2000; Pile, 1995).

The selection of floor coverings is important because they make up as much as 30% of a room's finished space. These materials can vary from hard and very smooth to highly textured and soft. Materials commonly used to finish a floor are wood, ceramic tile, vinyl composition tile (VCT), carpet, cork, and terrazzo (Nielson & Taylor, 2001; Pile,

1995). Carpet was the number one choice (89.5%) of the respondents for learner space design (see Table 17). The only other flooring material selected by the designers was VCT tile (10.5%).

Table 17: Distribution Of Interior Designers' Preferences for Flooring Type.

Item	Frequency	Percent
Carpet	34	89.5
VCT Tile	4	10.5
Wood	0	0
Ceramic tile	0	0
Cork	0	0
Terrazzo	0	0

When carpet is selected for a space, designers can help their selections last longer and enhance the overall appearance of the space by the type of carpet they select. Solid color carpets tend to show dirt and staining quickly. Solid color carpets also are prone to show foot traffic wear and seams. Multi-colored carpets allow for a mix of colors to be used in a room and for the room to be freshened up with new furnishing and wall treatments because the carpet usually lasts the longest of the interior finishes placed in a space (Nielsen & Taylor, 2001). Multi-colored carpets

help camouflage dirt, stains, and wear when colorations are correctly chosen. Multi-colored field carpets and solid borders can add a touch of elegance to a room and can give clues that extra effort and expense went into designing the space. However, this can limit future color choices of other finishes in the room. Multi-colored patterned carpets possess the same qualities as multi-colored carpets but can add interest to a space through the use of pattern. These patterns can be naturalistic, geometric, shapes, or lines in motion (Allen, Stimpson, & Jones, 2000; Nielson & Taylor, 2001; Pile, 1995). Multi-colored patterned carpets were the most popular with 74.4% of the respondents. Multi-colored carpets were second with only 20.5% of the respondents choosing them (see Table 18).

Table 18: Distribution Of Interior Designers' Preferences for Carpet Type.

Item	Frequency	Percent
Multi-colored patterned carpets	29	74.4
Multi-colored carpets	8	20.5
Solid colored borders and multi-colored fields	2	5.1
Solid color carpets	0	0

One other factor designers consider when selecting carpet is how much texture the carpet should have. Carpet

texture is classified as either loop, sheered, cut pile, or varying combinations of loop and sheered. Multi-level loop and loop carpets were the most popular with designers with 94.8% preferring their use (see Table 19).

Table 19: Distribution Of Interior Designers' Preferences for Carpet Pile.

Item	Frequency	Percent
Multi-level Loop	27	69.2
Level Loop	10	25.6
Sculptured	1	2.6
Cut Pile	1	2.6
Shag	0	0
Random Sheer	0	0

Work Experience and Design Choices

The relationship between the number of years a designer had worked in educational design and the choices made by a designer was investigated. The number of years the respondent had worked in educational design ranged from 1 to 28 with a mean of 11.91, median of 13.00, and a standard deviation of 7.48. The number of years was divided into three groups. The groups consisted of designers who had worked 1 to 10 years, 11 to 20 years, and 21 or more years in educational design. Using the chi-square procedure,

these groupings were compared to the designers' responses on the number of years a designer had worked in educational design. Out of the 10 possible areas, only one difference was found with respect to the number of years designers had worked in educational design and selections made by the designers (see Table 20). This item dealt with how designers would layout furnishings within a space. Designers who have designed for 20 or more years chose conference style layouts while those who have designed less years chose layouts using groups of tables and chairs.

Table 20: Chi Square of Years of Experience and Design Choices

Variable	Value	df	p
Layout	16.197	8	.040
Texture	12.337	8	.137
Carpet Type	6.622	4	.157
Light Color	4.973	4	.290
Carpet Pile	7.217	6	.301
Color Schemes	9.517	10	.484
Lamps	1.378	2	.502
Furnishings	2.988	4	.560
Floor Coverings	1.865	4	.761
Switching	1.432	4	.839

One-way analyses of variance were also employed to investigate differences in means for the number of years worked in educational design as related to responses from designers in the scenario. The scenario responses were collapsed into groups for this procedure. The first design element involving furniture selection was collapsed in two groups of flexible and non-flexible types. The element of flexible versus fixed layouts was not collapsed as it was already in two groups. Types of layouts using furnishings was collapsed into layouts using chair desks and layouts using tables and chairs. Lamp selection had responses in only two items out of the five listed, and those items were fluorescent lighting and combinations of lighting. Switching had responses on three of the four items listed, and these were multi-switching, dimmable switching, and adjustable preset scenes. Light color had responses in only three of the four items listed, so the groups of warm white light, soft white light, and combinations of cool and warm light were used. Color schemes were not collapsed into smaller groups as each item had a response, and the items were not related in a manner suitable for grouping. Wall texture was collapsed into two groups from the original six;

these were smooth hard finishes and textured finishes. Floor coverings had responses in only two areas, and those areas were VCT tile and carpet. Lastly, carpet type was collapsed into two groups which were multi-colored carpets and patterned carpets. Significant differences in years of education design experience were found for only two of the design elements; these were furniture selection and wall texture within a space (see Table 21).

The selection of what type of furnishings to be used in a learning space was affected by years of design. Those designers who had worked an average of 2.5 years in education design picked designs using desks whereas the designers who had worked an average of 12.41 years in education design picked designs using tables and chairs.

The selection of wall texture within a space was also affected by the number of year a designer had worked in educational design. Those designers who had worked an average of 7.11 years in education design selected hard non-texture finishes whereas designers who had worked in educational design for an average of 14.30 years picked textured wall surfaces to be used within learning space.

Table 21: ANOVA of Design Elements by Years of Design Experience

Variable	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Texture					
Between	448.32	1	448.32	9.88	.003
Within	1679.62	37	45.40		
Furnishings					
Between	189.67	1	186.67	3.96	.047
Within	1941.25	37	52.46		
Layout					
Between	123.53	1	123.53	2.22	.145
Within	2003.19	36	55.64		
Color Schemes					
Between	343.04	5	68.61	1.27	.301
Within	1784.90	33	54.09		
Carpet Type					
Between	27.17	1	27.17	.48	.493
Within	2100.77	37	56.78		
Fixed vs. Flexible					
Between	24.52	1	24.52	0.43	.515
Within	2103.42	37	56.85		
Light Color					
Between	77.96	2	38.98	0.67	.516
Within	2023.39	35	57.81		
Floor Coverings					
Between	11.26	1	11.26	.20	.660
Within	2116.67	37	57.21		
Switching					
Between	20.99	2	10.49	0.18	.837
Within	2106.65	36	58.53		
Lamps					
Between	4.88	1	4.88	0.01	.977
Within	2127.89	37	57.51		

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Educational institutions are increasingly being viewed as providers of a service. It is the designer's responsibility to be cognizant of ways in which learning environments can be designed that maximize the ability of the classroom to enhance learning. The present study was undertaken to examine how adult learning spaces are being designed and the degree to which university designers, administrators, and faculty approach their design as a servicescape.

The purpose of the study was to describe factors that influence how interior designers approach adult learning space design. The study examined the physical climate, including design requirements related to classroom style, ambient conditions, lighting, color selection, and visual considerations for adults in a learning space. The data were collected based upon theoretical considerations noted

in the literature for the design of adult learning spaces. The population surveyed consisted of 77 members of the Association of University Interior Designers of which 39 participated.

Data were gathered in two areas. One area dealt with what faculty and administrators requested of educational designers when designing adult learning space. The other area dealt with how designers would approach adult learning environment design if they were allowed to design a space without input from administrators or faculty at their institution. Years of experience in educational design and years of experience in general design were examined to determine if they were factors in the choice of design utilized. The requests of what administrators and faculty requested in adult learning space designs at their respective institutions were correlated. In addition, descriptive statistics were used to examine whether or not the designers perceived themselves and their administrators and faculty as being cognizant of their institution as being a service provider.

Service Orientations

Results indicate that designers consider adult learning

to be a service of their institution and also feel that their administrators and faculty consider learning to be a service provided by their institution. Approximately three-fourths of administrators were perceived to agree that they considered the institution to be a service provider. However, almost 90% of the faculty were perceived to be cognizant that the institution provided education as a service. When designers responded about their own perceptions of learning space, all endorsed that they either strongly agreed or agreed that the institution provided education as a service.

The study also examined to what extent designers perceived administrators and faculty as collaborators in designing learning spaces servicescape. Designers reported that they considered less than half of their administrators and less than one-third of their faculty as being interested in soliciting information from others in learning space design. This is in sharp contrast to designers' responses, indicating that approximately 75% of them solicit this input from learners, faculty, and administration officials at their respective institutions.

Design Elements

The design of a learning space involves many design elements, such as room arrangement, furnishings, room layout, seating styles, room color, and lighting design. Designers were asked to rate how often administrators and faculty requested various learning space design elements when they were setting up or remodeling classrooms.

Seating Styles. Designers reported that administrators and faculty approximately three-fourths of the time requested designs using movable desks, chairs, and tables. By contrast, both administrators and faculty preferred auditorium and fixed desk seating approximately one-third of the time. There was a strong correlation between the requests of faculty and administrators. Most of the time, both administrators and faculty requested flexible seating types in classroom design. This allows facilitators of learning to easily re-arrange the classroom to accommodate differing learning situations that arise. Therefore, it is user friendly and service oriented.

Furnishings. Administrators and faculty request designs that use furnishings that are flexible and allow for group interaction and re-arrangement of the space for

collaborative learning. Approximately half of the faculty and two-thirds of administrators request desks with moderate writing spaces. In contrast, three-fourths of the faculty and administrators prefer tables and chairs in design. Half of the faculty and administrators also prefer groupings of tables and chairs. Designs using tables and chairs are consistent with the perception of providing education as a service.

Fixed versus Flexible Layout. For layout design, 90% of the time faculty and administrators request flexible furnishing over fixed furnishings in the learning space. Again, this is supportive of providing an interactive learning space that allows learners to easily re-arrange the space.

Room Arrangement. There is strong agreement between faculty and administrators regarding room arrangement in the learning space. Designers report that three-fourths of the time faculty and administrators request room arrangements which employ tables in rows with comfortable chairs. Seventy-four percent of the faculty request layouts of groupings of tables and comfortable chairs in contrast to only 59% of the administrators favoring this grouping.

Layouts using desks facing the front of the room are also fairly popular with 62% of administrators in contrast to 44% of the faculty. Having rooms in circular layouts is less popular with both administrators and faculty, with approximately one-third of both groups favoring this arrangement. Conference style layouts are popular with both faculty and administrators with more than one-half of both groups endorsing this seating arrangement. With this layout, the desks are not fixed and can be moved if the demands of the learning environment so dictate.

Color. Respondents to the survey did not indicate a strong preference for color. Most preferences clustered around neutral responses even though color is generally the most easily and inexpensively changed component of the learning space.

Lighting Design. For lighting, 62% of the faculty and 97% percent of the administrators requested fluorescent lighting. Fluorescent lamps are the least expensive to operate of any of the lighting systems. By contrast, incandescent lighting requests were more preferred by faculty (43%) than administrators (25%). Incandescent lighting is more easily manipulated with dimmers within the

space, is a warmer light source, and lacks the flicker that is a frequent complaint with fluorescent lighting. However, lamp lives are short, and incandescent lighting has higher energy consumption than fluorescent lighting.

Switching. Administrators and faculty request flexible lighting solutions. This allows the lighting levels to be converted to enhance the ability to use the classroom for multiple learning situations to accommodate presentations and multimedia usage. To accomplish this, 89% of the faculty and 70% of administrators prefer the use of multi-switching or to have more than one level of switching in a space. This is in contrast to a single on/off switch which is only requested approximately 18% of the time by both administrators and faculty. Dimmable switches were requested approximately three-fourths of the time by designers. Preset scenes are requested approximately one-fourth of the time by designers. Flexible switching makes the classroom user friendly.

Preferences of Interior Designers

The respondents were given scenarios of possible situations in which they were to design a learning space independent of outside influence. In the first scenario,

the designer was asked to select furnishings and provide furniture layout for a newly completed adult learning center. The scenario included multiple choice selections dealing with types of furnishings and their layout.

Designers chose furnishings that provided flexible designs with their selection of small tables and comfortable chairs and differing sized tables for grouping with comfortable chairs. This is also supportive of flexible designs which allow the learner and facilitator of learning to re-arrange the learning space to meet a variety of learning activities.

The second scenario dealt with asking the designers to provide recommendations for lighting design in four classrooms of an adult learning center on their campus. For lighting, almost three-fourths of the designers indicated a preference for combinations of incandescent, fluorescent, and low-voltage lamps. The remaining one-fourth selected fluorescent lighting. For lighting, approximately half of the designers preferred warm, white light. About one-third had a stated preference for soft, white light. Approximately one-fifth preferred a combination of cool and warm light. For switching, designers equally preferred

multiple switching and dimmable switching in learning spaces.

The third scenario dealt with color, types of finishes, and textures for a given space. The most popular color scheme selected by interior designers was a combination of warm and warm neutral colors. The second most popular was a combination of cool and warm colors. The last preference was warm neutrals. Few designers chose cool color schemes, combinations of cool and cool neutral colors, or warm color schemes.

Approximately one-third of the designers equally preferred a combination of smooth, hard, and textured finishes and smooth, hard finishes for adult learning space. About one-fourth of the designers selected a combination of smooth, hard textured finishes, and wallpaper.

Overwhelmingly, nine-tenths of the designers selected carpet for floor covering. Only one-tenth selected VCT tile. The selection of carpet adds texture, softness, and warmth to the setting as well as provides for the reduction of sound and noise. This also relates to selecting materials that provide texture to the learning environment. Carpet color selection examined choices for multi-colored,

patterned carpets; multi-colored carpets; solid color borders and multi-colored fields; and solid colored carpets. Three-fourths of the designers preferred multi-colored, patterned carpets. Approximately one-fifth of the time, they preferred multi-colored colors without a pattern.

The final section of the scenario dealt with carpet pile. Carpet pile choices consisted of multi-level loop, level loop, sculptured, cut-pile, shag, and random sheer. Multi-level loop was preferred by approximately three-fourths of the designers whereas level loop was preferred by approximately one-fourth of the designers. No one selected shag or random sheer pile. Sculptured and cut-pile were selected by only 3% of designers.

Service Conclusions

Research questions one, two, and three dealt with designers' perceptions of faculty and administrators toward education as a service as well as the designers' own beliefs toward education as a service. The following conclusions are based upon the findings related to these questions.

Designers, faculty, and administrators alike consider their institutions to be providers not only of learning but also of learning as a service.

Designers are more aware of the needs of the adult learner in designing an adult learning space than are faculty and administrators.

Designers are more collaborative than faculty and administrators when designing learning space.

When permitted, designers maximize design elements' impact upon learning environments through the use of color, texture, lighting, furnishings, and layout. However, the university designers surveyed did not always feel that their administrators and faculty were in agreement with their selection of materials. Faculty requested design elements that make the learning environment generally learner-centered but still within their control. Administrators requested elements that were indicative of teacher-centered environments at times and at other times were indicative of desiring a learner-centered environment. For example, administrators requested the use of fixed desks and also the use of tables and chairs. This dichotomy of administrator requests may be reflective of a desire to be cost efficient as chair desks are less expensive than tables and chairs.

In general, however, administrators, faculty, and designers prefer design elements that support education as a service. Most service industry providers want their

customers to be repeat users. A perception of education as a service and of a service that can be repeated throughout a lifetime should strongly influence the design of the learning environment. However, the three groups diverged and felt that the design of the learning space is important. While 100% of designers agreed that the design of the learning space was very important, 75% of the administrators and 90% of the faculty consider the design of a learning space as important. This suggests that administrators, at least 25% of the time, and faculty, 10% of the time, may feel learning space design is unimportant.

Since university administrators typically have the final word in deciding how a learning space is to be implemented, many classrooms may not be designed in a manner to enhance learning as often as one-fourth of the time based on the perceived importance placed on learning space design by administrators. Other variables, such as cost, may prove to be of greater importance than the aesthetics of the servicescape, even if those aesthetics enhance learning.

When it comes to soliciting input from others on the design of the learning environment, less than half the administrators requested input from others and less than

one-third of the faculty did. By contrast, three-fourths of the designers requested input from students, faculty, and administrators before making decisions regarding the design of the learning space. These differences may be due to roles within the educational institution and the way different stakeholders view the process of design. A priority for input into the educational design by faculty is lacking. Faculty may believe that they have little influence on the design of the educational structure, and many may not know how to go about influencing the design. Put simply, many faculty may never have been asked for input into the interior design of the educational setting and may be unaware of the opportunities to provide input into the design. Thus, their collaboration rate in the process may be low because of a lack of awareness or power. Administrators, on the other hand, have the responsibility to make decisions. They gather some but not extensive information for this decision-making.

The interior designers have a different role than faculty and administrators in the design process. They need to create designs that not only reflect their knowledge, ideas, and creativity but which also fulfill client needs.

In order to do this, they must be collaborative with the various end-users that will be using the servicescape.

This collaborative nature requires that institutional designers be in tune with the premise of learning being a service. This has tremendous importance when one considers the designers' involvement in the application of the delivery of learning services. Knowles (1981) states that the learning environment should be flexible and serviceable for the facilitator and the learner using the space. The designers can play a key role in connecting this learning theory and the application of learning theory through their designs in making these learning spaces more "user friendly".

When working on a design with administrators and faculty, designers should take the lead in designing learning space because of their desire to work collaboratively by gaining input from all parties involved in the design of the space. Designers have the greatest knowledge of how color, lighting, materials, and furniture selection and placement affect the learning space design. Therefore, they can provide a leadership role to assure that

quality design elements are incorporated into the servicescape.

Designers, administrators, and faculty can work together to better understand each other's roles in designing learning space. This cooperative effort should be based on Knowles' model for program planning and on how it impacts the design of learning space. Information should be included in this effort about how learning should be viewed as a service and not just something higher education institutions provide. In addition, it should include how the selection of different elements impacts the dynamics of learning spaces and how the selection of elements sends messages to the learner about the space and the importance an institution places on the design of learning space.

Design Elements Conclusions

Research questions four, five, and six dealt with the requests of faculty and administrators upon designers as well as the decisions designers make toward learning space design. The following conclusions are based upon the findings related to these questions.

University interior designers' preferences support a positive adult learning environment.

Administrators, faculty, and designers often desire flexible designs as the best solution when designing learning space.

Administrators and faculty are in general agreement on the selection of most interior elements in the design of the learning space.

Administrators and faculty lack an understanding or knowledge about the impact color can have on a learning space.

Designers have a greater awareness than do faculty or administrators of the effects that design elements can have in creating a learning space that is supportive of adult learning.

Flexibility

When designing learning space, flexibility is the desire of administrators, faculty, and designers, as indicated by requests for and selections of the interior design elements. Flexible furnishings allow for the facilitator of learning to reconfigure the learning environment to meet the needs of the individual facilitator and the needs of the learner.

It is important to consider the activities of a learning space when selecting furnishings. Moveable chair desks with small writing surfaces allow learners and facilitators of learning to re-arrange the room easily while still allowing adequate work surface for learners to spread

out and work collaboratively on projects. Small and large tables and comfortable chairs allow work space and the ability to group when learners are working in groups or to face each other during group discussions (American School and University, 1998; Blackett & Standfield, 1994; Keown, 1999; Muller, Probasco, & Schuh, 1985; Owu, 1992; Rath & Ittleson, 1981; Tessmer & Harris, 1992). Comfortable chairs are important because adult learning classes on college campuses are usually multiple hours in length and are held during the evening hours (Caffarella, 1994).

The type of room arrangement can also affect adult learning. Flexible arrangements allow both learners and facilitators of learning to easily re-arrange a room. Certain types of room arrangements send messages to the learner regarding the type of activities and learning experiences to expect within the learning environment (American School & University, 1998; Duffy & Cunningham, 1996).

When faced with furniture selection, both faculty and administrators favor the use of chair desks, but all parties greatly favor the use of chairs and tables in learning space design. This may indicate that faculty and administrators

have a desire to provide comfortable furnishings when given a choice and budget allows. The choice of chair desks could be as a cost saving measure or that with which they are most familiar. On the other hand, all these groups favored the use of tables and chairs. The use of tables and chairs allows learners to spread out work or work collaboratively with each other on projects. These selections of furnishing are conducive to and supportive of creating a learner-centered environment. They allow for a greater degree of flexibility in using a learning space. The overwhelming selection of flexible designs over fixed is consistent with the learner-centered approach to learning. It suggests that learners must be able to re-arrange the room to meet the needs of learning in order to construct knowledge rather than knowledge being a transmission (Duffy & Cunningham, 1996).

Brookfield (1986) discusses six principles of effective practice as related to adult education. The first principle says learning is voluntary and adults engage in learning due to an innate desire to develop new skills. Because of this willingness to learn, they are likely to want to participate in learning techniques which utilize group discussion, role

playing, games, small group work, and collaborative efforts. Therefore, learning spaces that employ flexible furnishings support the needs of adult learners and the activities used to facilitate adult learning.

Flexible furnishings are also supportive of a collaborative spirit in the learning space. Collaborative activities are grounded in ideas of voluntary learning. This collaborative learning allows adults to meet in small or large groups to explore issues and to discuss concerns to create new bodies of knowledge. By acknowledging that adult learning is a collaborative effort, one further supports the idea that a learning space needs to be flexible in order to meet the needs of learners (Brookfield, 1986). Therefore, it is important for administrators, faculty, and designers to understand the needs of adult learning with respect to furniture selection and layout when approaching learning space design.

Lighting

The selection of lighting and lighting design plays an important role in design element selection. Fluorescent lighting is the most popular for use in educational environments because of its low operating cost and long

life-span. Today, fluorescent lighting can provide even light distribution and good color rendering qualities and can be used in dimmable applications (Grant, 1991; Rea, 2000; Ward, 1991). Both low voltage and incandescent lamps are good sources of lighting for performing tasks in learning spaces but are less commonly used due to the expense of operation and short life-spans (Michel, 1996; Rea, 2000). Many times educational institutions use these types of lamps for accent and space where conference style designs are employed (Rea, 2000).

When the lighting requests of administrators and faculty at their institutions are compared, administrators preferred fluorescent, and faculty preferred incandescent lighting. Designers preferred combinations of fluorescent, incandescent, and low voltage lighting. Thus, designers seek ways to employ multiple layers of lighting to enhance the activities of a learning space while administrators may rely on the cost effective fluorescent lighting. Faculty preferences may be more indicative of familiarity with incandescent since it is what is typically used in residential applications. The designers' choices reflect a more flexible lighting system for the space and may be more

in keeping with the needs of adult learners and in making the learning space more responsive to those needs.

In adult learning, flexibility of lighting is important on many levels. Learners' biological needs affect the requirements of lighting. As learners become older, they need more light and flexible systems in order to control the light within the learning space (Block & Rosenblum, 1987). Having lighting systems that are flexible is supportive of meeting the active learning needs of adult learners by allowing them to change the lighting to desired levels for differing activities. Finally, flexible light allows adult learners to take control of their learning environment and to change it according for a specific learning activity (Knowles, 1981).

The color of lighting can also enhance the design of learning space. The warm white light, which is preferred by designers and faculty, is more like that found in incandescent lighting and is reflective of the faculty requests. However, this warm white light can also be produced by fluorescent lamps, which is congruent with the administrators' preferences for cost effective lighting. Warm lighting can also enhance and help prevent glare on

printed information like that found in textbooks and handouts on white paper. The choice of warm lighting is supportive of the needs of aging adults due to thickening and yellowing of the lens of the eye. Lighting that is cool in color tends to scatter more in the eye as it experiences the aging process whereas warm light has less scatter (Elworth, Larry, & Malmstrom, 1986).

No designer selected cool white light as a lighting preference. Similar to light on stormy, overcast days, cool white light promotes drowsiness and lower levels of activity. It also tends to cause glare on white pages and make print more difficult to read on white paper, which would be problematic for the older adult learner.

Lastly, in lighting design, one must decide how to turn the selected lighting on and off through the switching design. Designs which give the most flexibility were top choices with designers. This is also reflective of administrators' and faculty's desires. Pre-set scenes were preferred by about 20% of the administrators, faculty, and designers. The designs which employ multiple switching and dimming were desired most by all three groups. With multi and dimmable switching, facilitators of learning can make

lighting fit the appropriate illuminance level for a given task (Gordon & Nuckolls, 1995; Hawkins, 1991; Michel, 1996; Nuckolls, 1983; Rea, 2000; Smith & Bertolone, 1986). These choices are reflective of providing a flexible lighting design that can be changed as the demands that the learning space require. These demands can be anything from a multi-media presentation to the opposing needs of various work groups in the space. This indicates that designers, administrators, and faculty all recognize that an adult learning space needs a lighting design that provides for flexibility of usage.

The use of multiple layers and lighting with multiple means of switching as preferred by designers is a way to help with the biological and physical needs of adult learners. The physiology of the aging eye changes the visual requirements of adult learners; therefore, the need for better lighting systems becomes apparent (Kline, 1994). Light sources that are too bright can cause glare and reduce the visual performance of older learners as well as younger learners. By having flexible, layered lighting systems, designers can provide for the needs of adult learners and improve the usefulness of the learning space (Bennet, 1977).

The design of lighting is also important in learning space design. The overarching goal of lighting in a learning space is to provide a visual environment for both adult learners and facilitators of learning that is supportive of the learning processes (Michel, 1996; Smith & Bertolone, 1986; Rea, 2000). A well-designed lighting system can provide the appropriate illuminance level for the task. If the system is designed poorly, it can create reflective glare, veiling reflections, and excessive luminance in the field of vision that can compromise visibility (Rea, 2000). The most important lighting design factors to be considered when designing adult learning spaces are direct glare, horizontal and vertical illuminance, light distribution on surfaces, and light distribution in the task area. These issues can be addressed through the use of layered lighting.

Administrators and faculty should have means of understanding the effects and cost of lighting selection in learning design. This should include what are good sources of lighting to use for learning space as well as that which should be avoided. Administrators and faculty also need to be aware of how to use lighting to enhance differing

activities in the learning space. Finally, they need to know how lighting can be responsive to the psychological and emotional needs of learners. Lighting can make a learning environment pleasant and attractive, reinforce feelings of spaciousness, delineate areas of different functions, stimulate learning, and improve behavior (Hawkins, 1991; Gordon & Nuckolls, 1995; Michel, 1996; Nuckolls, 1983; Rea, 2000; Smith & Bertolone, 1986). The lighting design preferences of most of the designers account for these factors. However, the lighting design requests of faculty and administrators do not always address all of these effects of the lighting design. Thus, designers need to use their collaborative efforts as a means of informing administrators and faculty about these elements.

Color

The selection of color schemes contained mixed results. The requests of administrators and faculty do not reflect a knowledge or understanding of the selection of color as an enhancement to the promotion of a learning environment. Requests from these groups reflected a neutral stance in the selection of color. Designers can provide a valuable service in the education of faculty and administrators in

this regard. Designers have an understanding of how color affects the moods and behaviors of individuals within a space.

Designers were very specific in their color selections. They selected warm and warm neutral color schemes that promote activity, interaction, conversation, and arousal in the learner. Warm color schemes are those which include reds, oranges, and yellows. Warm neutral colors are browns, beige, and those tones generally associated with wood. These colors can be in varying shades and tints and in varying combinations (Pile, 1995). While designers were firm in their color choices, faculty and administrators tended to have no strong preference for color schemes. However, when a preference was given, it was similar to that of the designers' for warm and warm neutrals colors.

Color plays a considerable role in the way people act and interact in the learning space (Hawkins, 1991; Pile, 1995). Color researchers find that the warm colors such as red, orange, yellow, and pink are predisposed to encourage learners to be active whereas cool colors such as blue, grey, and green are predisposed to relax them (Hawkins, 1991; Myers, 2004; Pile, 1995). Knowles (1980) states that

colors selected for adult learning spaces should be those from the brighter side rather than from the duller side of the rainbow; that is, they should be warm colors. Therefore, in order to create an environment that psychologically supports an active learning, warm and warm neutral color schemes should be used.

For any given color, there is an associated effect. Color in the learning space may be used to give the space warmth, dimension, and size. Administrators and faculty should have a basic understanding of the effect of color and how color can influence the perceptions of users of the learning environment. This basic understanding could be conveyed by interior designers when discussing learning space renovations with administrators and faculty. Designers could inform faculty and administrators that warm and warm neutral color schemes are conducive for a learner-centered environment. Cool and cool neutral colors are color schemes which promote inactiveness in participants using the space. These types of color schemes are very useful for teacher-centered learning. Cool color schemes promote passiveness in the learners which is good for an environment where the only activity is listening and taking

notes. Combinations of warm colors and warm neutrals promote activity and conversation within a space and are conducive to interaction. Warm color schemes are good for these environment because they promote activity and help with arousal for open discussions (Hawkins, 1991; Pile, 1995).

Training sessions should be developed to assist administrators and faculty alike in understanding the benefits of color in learning space design. The selection of color can be one of the most inexpensive or expensive items to change in learning spaces depending on the item for which color is selected (Myers, 2004; Zernike, 2001). If color is added to space by means of paint selection, it can be changed easily and for a low cost. Color on furnishings, floor coverings, and window treatments is much harder to change and has a greater cost involved (Myers, 2004). Properly used, color makes an important investment toward an improved learning space (Hawkins, 1991; Pile, 1995).

Texture

When faced with the selection of the texture of materials used in the learning space, designers most often sought materials which added texture. The combinations of

smooth, hard, and textured finishes provide sound control and add variety to an adult learning space. This can enhance student attention and arousal to promote learning. If there is the right balance of texture and space, glare from lighting is reduced and acoustics are improved. If a room has all hard surfaces, sound will bounce around and create an echo, and lighting can cause glare. Rooms with too much texture can make it difficult for those sitting far away from the one speaking to hear what is being said and to participate in the discussion (Flynn, Kremmers, Segil, & Steffy, 1992; Pile, 1995). When selecting these finishes, designers must give consideration to the ease of cleaning the finish. This is a major consideration on college campuses due to the high rate of turnover and frequent shortages in cleaning staff. In order to keep a space looking clean and fresh, smooth hard finishes can be used for quickness of cleaning and durability (Allen, Stimpson, & Jones, 2000; Pile, 1995).

The selection of floor coverings also can add to the texture of a space. Carpet adds texture, softness, and warmth, and it possesses good qualities for sound and noise control in a space. Carpet is easily maintained and wears

well when properly selected for a space. VCT is a good selection in some applications for learning space such as laboratories and spaces where spills of chemicals and clean up is an issue of concern. VCT does not possess good sound and noise control quality but is the easiest material to clean and maintain (Allen, Stimpson, & Jones, 2000). When selecting floor coverings, designers strongly demonstrate a preference for carpet over the other selections.

Thus, texture in adult learning space can be added through a variety materials. More importantly, Knowles (1980) points out that finishes should be selected on the bases of making a space feel warm and inviting. The space should be more like one's own living room and create interaction through the use of materials selected for the space. Tough's (1978) classic work on self-directed learning found that adults' preferred place for learning was home. Thus, design elements that can simulate the home environment can support this learning preference.

Recommendations for Future Research

This research was a descriptive study of (a) the perceptions of designers related to their views and the views of faculty and administrators related to the

servicescape and (b) of the requests they receive from faculty and administrators related to design elements in the learning environment. The findings and conclusions from this study could be enhanced by future studies that are descriptive in nature, experimental, and qualitative.

Descriptive research could include different audiences to be surveyed. These audiences might include faculty, administrators, and adult learners. The surveys could be directed at their ideas of how adult learning spaces could be designed to meet their needs. These surveys could also include sections on what these individuals feel may be missing in learning space design or how they would like to be involved in the decision making process of the design. This additional research, which directly surveys administrator, faculty, and adult learner preferences, could yield further information on design preferences for adult learning spaces.

In addition to descriptive designs, experimental research could be conducted where actual classrooms are set up employing various design solutions to see how learners and faculty interact and how these solutions impact adult learning. For example, these designs could be fixed versus

flexible designs. Other variations could be designs using differing color schemes of cool and warm colors to designs with differing textures and lighting schemes. The possibilities are extensive just by combining the different elements which make up a learning space.

Qualitative studies could be conducted by interviewing administrators, designers, faculty, and adult learners about the design of learning space. These interview could be conducted as a follow-up to an experimental design, used to evaluate newly designed learning space for adult learners, or conducted before the implementation of a design as a means to develop new learning space design. Such research could provide valuable insight into the impact of design theory on learning environment settings. Other qualitative studies could observe learning in various educational settings.

Conclusion

The findings and conclusions from this study support the macro conclusion that the elements of good design are congruent with the needs of a good adult learning environment that is learner-centered and supports active learning. Through their training and instincts, most

designers seek to implement these design elements. Since these design elements and effective learning principles are congruent, designers do not need to be taught adult learning theory. However, they could benefit from knowing the characteristics of the adult learner and that these characteristics are congruent with good design. This could be achieved through a short course on characteristics of adult learners and how they relate to good design. As Knowles (1990) suggests and as the data from this study supports, some of these characteristics are discovered with years of experience. This could be complemented by making designers aware of this early in their career through course work or professional workshops at organization meeting and conferences.

In addition, faculty and administrators need to be made aware that some of their requests support a good adult learning environment but that others do not. With the growing number of adult learners in their classes, they need to be aware of the learner-center orientation of adult learners and of the design elements that can enhance this. This could be integrated as part of faculty and

administrator orientation when hired at institutions or as part of an effective teaching program.

Universities would benefit from using a collaborative approach for designing learning spaces. This approach should include administrators, faculty, learners, and interiors designers when approaching learning space design. As part of this collaboration, programming should be in place to quickly educate those involved on what makes for good design for adult learners and on what meets the needs for which the space is being designed for whether it is a laboratory space or a learning space for group interaction and discussion.

In today's learning spaces where teachers serve as facilitators for active student involvement and where power is allotted across actors, learning space needs are seen to be far more dynamic and situational than under the older model of pedagogy. The andragogical model of thinking about facilitating learning implies the need for small-group meeting spaces, project spaces, spaces for whole-class dialogue where adult learners as well as the facilitator of learning can be seen and heard, spaces where technology can be accessed easily, spaces for display of ideas and working

documents, and spaces that can accommodate the movement of learning activities. Once more, this variety of spaces is not likely to be in traditional academic classrooms. Learning activities could even spillover into wide corridors or lobbies outside classrooms and into outdoor spaces. Adult learning spaces should also include spaces that include possibilities for refreshments.

These types of changes are prompted by market forces as well as by changes in teaching approaches because the competition for students among colleges and universities and between institutions and the corporate world is at an all time high (Chism, 2002). Many institutions are becoming more service oriented and looking at education as a service they provide to learners. As with many challenges, the need to rethink learning space issues can open opportunities to the ways in which contemporary scholars suggest learning can best be facilitated.

References

- Allen, P. S., Stimpson, M. F., & Jones, L. M. (2000). Beginnings of interior environment (8th ed.). New Jersey: Prentice Hall
- American School & University. (1998, January). The top ten: Design ideas for schools of the twenty first century. American School and University, 18-30.
- Baker, J. (1987). The role of environment in marketing services: The consumer perspective. In J. A. Czepiel, C. A. Congram, & J. Shanahan (Eds.), The services challenge: integrating for competitive advantage. Chicago: American Marketing Association, 79-84.
- Baker, J., Berry, L. L., & Parasuraman, A. (1998). The marketing impact of branch facility design. Journal of Retail Banking, 10(2), 33-42.
- Bennet, C. A. (1977). The demographic variables of discomfort glare. Lighting, Design and Application, 7, 22-24.
- Bitner, M. J. (1986). Consumer responses to the physical environment in service settings. In D. M. Venkatesan, D. M. Schmalensee, & C. Marshall (Eds.), Creativity in service marketing: What's new, what works, what's developing. Chicago: American Marketing Association, 89-93.
- Bitner, M. J. (1990). Evaluating service encounters: The effects of physical surroundings and employee responses. Journal of Marketing, 54(2), 69-82.

- Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. Journal of Marketing, 56(4), 57-71.
- Blackett, A., & Stanfield, B. (1994). A planner's guide to tomorrow's classrooms. Planning for Higher Education, 22, 25-31.
- Block, M. G., & Rosenblum, W. M. (1987). MTF measurements of the human lens. Journal of the Optical Society of America, 4, 7.
- Boettner, E. A., & Wolter, J. R. (1962). Transmission of ocular media. Investigative Ophthalmology, 1, 776-783.
- Booms, B. H., & Bitner, M. J. (1982). Marketing services by managing the environment. The Cornell Hotel and Restaurant Administration Quarterly, 23(1), 35-39.
- Boyatzis, C. J., & Varghese, R. (1994). Children's emotional associations with colors. The Journal of Genetic Psychology, 155, 77-85.
- Brookfield, S. D. (1986). Understanding and facilitating adult learning. San Francisco: Jossey-Bass.
- Caffarella, R. S. (1994) Planning programs for adult learners: A practical guide for educators trainers and staff developers. San Francisco: Jossey-Bass.
- Carter, J. H. (1982) The effects of aging on selected visual functions: Color visions, glare sensitivity, field of vision, and accommodation. In R. Sekuler, D. W. Kline, & K. Dismukes (Eds.), Aging in human visual function, (pp. 121-130). New York: Alan Liss.
- Chism, N. (2002). A tale of two classrooms. New Directions for Teaching and Learning, 92,(1), 5-12.

- Cho, H., & LaRose, R. (1999). Privacy issues in Internet surveys. Social Science Computer Review, 17, 421-434.
- Choungourian, A. (1968). Color preferences and cultural variation. Perceptual and Motor Skills, 26, 1203-1206.
- Choungourian, A. (1972). Extraversion, neuroticism, and color preferences. Perceptual and Motor Skills, 34, 724-726.
- Church, A. H. (1993). Estimating the effect of incentives on mail survey response rates: A meta-analysis. Public Opinion Quarterly, 51, 62-79.
- Council of Education Facility Planners, International (1991). College and university planning. The Guide for Planning Educational Facilities (pp. P1-P9). Columbus, OH: Council of Education Facility Planners, International.
- Curasi, C. F. (2001). A critical exploration of face-to-face interviewing vs. computer-mediated interviewing. International Journal of Market Research, 43(4), 359-375.
- Dillman, D. A. (1978). Mail and telephone surveys: The total design method. New York: Wiley-Interscience.
- Dillman, D. A. (2000). Mail and Internet surveys: The tailored design method. New York: Wiley.
- Dillman, D. A. (2002). Navigating the rapids of change: Some observations on survey methodology in the early 21st century. Paper presented to American Association for Public Opinion Research annual meeting, St. Petersburg, Florida.
- Dillman, D. A., Tortora, R. D., & Bowker, D. (1998). Principles for constructing web surveys: An initial

statement. Technical report 98-50, Social and Economic Sciences Center. Washington State University, Pullman, WA.

Dillman, D. A., Tortora, R. D., Conradt, J., & Bowker, D., (1998). Influence of plan vs. fancy design on response rates for web surveys. Unpublished paper presented at annual meeting of the American Statistical Association, Dallas, TX.

Donovan, R. J., & Rossiter, J. R. (1992, Spring). Store atmosphere: An environmental psychology approach. Journal of Retailing, 58(1), 34-57.

Drake, L., & Rudner, L. (1995). Assessment and on the Internet. ERIC/AE Digest. Washington, DC: ERIC Clearinghouse on Assessment and Evaluation, The Catholic University of America (ERIC Identifier ED385609).

Draves, W. A. (1995). Energizing the learning environment. Manhattan, KS: Learning Resources Network.

Duke-Elder, W. S. (1968) The physiology of the eye of vision. System of Ophthalmology, 4, St Louis: C. V. Mosby.

Duckenfield, M. (1995). Schools for cities (Report No. ISBN-926414324-6). Europe: Organization for Economic Cooperation Development. (ERIC Document Reproduction Service No. ED 409 416)

Duffy, T. M., & Cunningham, D. J. (1996). Constructivism: Implications for the design and delivery of instruction. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology: A Project of the association for educational communication and technology (pp. 170-198). New York: Macmillian Library Reference.

- Elworth, C. L., Larry, C., & Malmstron, F. U. (1986). Age, degraded viewing environments, and the speed of accommodation. Aviation, Space, and Environmental Medicine, 57, 54-58.
- Emery, V. (1995). How to grow your business on the Internet. New York: Coriolis Group.
- Etnier, J. L., & Hardy, C. J. (1997). The effects of environmental color. Journal of Sport Behavior, 20(3), 299-312.
- Fehrman, K. R., & Fehrman, C. (2000). Color: The secret influence. Upper Saddle River, NJ: Prentice Hall.
- Fisher, J. A., & Christie, A. W. (1965). A note on disability glare. Vision Research, 5, 565.
- Fite, G. (1966) History of the Oklahoma Center for Continuing Education. (Available from the University of Oklahoma, 1700 ASP Avenue, Room 111, Norman, OK 73072-6400)
- Flynn, J. E., Kremers, J. A., Segil, A. W., & Steffy, G. R. (1992). Architectural interior systems: Lighting, acoustics, air conditioning (3rd ed.). New York: Van Nostrand Reinhold.
- Fulton, R. D. (1991). A conceptual model for understanding the physical attributes of learning environments. In R. Hiemstra (Ed.), Creating environments for effect adult learning. New Directions for Adults and Continuing Education No. 50. San Francisco: Jossey-Bass.
- Furlong, D. K. (1997). Between anecdote and science: Using e-mail to learn about student experiences [on-line] Conference paper presented at the 37th Annual Forum of

the Association for Institutional Research, Orlando, FL. Abstract from ERIC database: ED410862.

- Gay, L. R. (1987). Educational research. Columbus, OH: Merrill.
- Geib, M. P. (2002). A future of possibilities for workforce development: Customizing training for business and industry. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.
- Ghostbear, A. (2001). Adult learning on the Internet: Engaging the eBay auction process. Unpublished doctoral dissertation, Oklahoma State University, Stillwater
- Gilbride, D., & Stensrud, R. (1999). Expanding our horizon: Using the Internet on rehabilitation education. Rehabilitation Education, 13, 219-229.
- Goodman, R. J. & Smith, D. G. (1992). Retirement facilities: Planning, designing, and marketing. New York: Waston-Guptill.
- Gordon, G., & Nuckolls, J. L. (1995) Interior lighting for designers. New York: J. Wiley.
- Goree, C. T., & Marszalek, J. F. III. (1995). Electronic surveys: Ethical issues for researchers. College Student Affairs Journal, 15, 75-79.
- Gorham, R. (1981). Space utilization: What factors determine its impact on learning. In P. J. Sleeman & D. M. Rockwell (Eds.). Designing Learning Environments (pp. 69-74). New York: Longman.
- Grant, J. (1991). The budget guide to retail store planning and design (Rev. Ed.). Cincinnati, OH: ST Publications.



- Hawkins, H. (1991). The environment for learning. In Guide for Planning Educational Facilities (pp. I1-I16). Ohio: Council of Educational Facility Planners, International.
- Hemphill, M. (1996). A note on adult's color-emotion associations. The Journal of Genetic Psychology, 157(3), 275-280.
- Hiemstra, R. (1991). Creating environments for effect adult learning. New Directions for Adults and Continuing Education: No. 50. San Francisco: Jossey-Bass.
- Hughes, B. (2002) Continuing professional education in athletic training. Unpublished doctoral dissertation, Oklahoma State University, Stillwater
- Jones, S. G. (1999). Doing Internet research: Critical issues and methods for examining the Net. Thousand Oaks, CA: Sage.
- Keown, C. (1999, August). A learning curve: When installing technology, develop a customized strategy for your campus. American School and University, 116-199.
- Kicklighter, C. E., & Kicklighter, J. C. (1992). Residential housing. South Holland, IL: The Goodheart-Willcox Company, Inc. Publishers.
- Kidd, J. (1973). Relentless verity: Education for being-becoming-belonging. Syracuse, NY: A Publication in Continuing Education.
- Kiesler, S., & Sproull, L. S. (1986). Response effects in the electronic survey. Public Opinion Quarterly, 50, 402-413.
- Kirby, C. (1999, December). Making demands: Technology and changes in instructional techniques have changed the

look of classrooms. American School and University,
34a-34d.

Kittleson, M. J. (1995). An assessment of the response rate
via the postal service and e-mail. Health Values, 18,
27-29.

Kline, D. W. (1994). Optimizing the visibility of displays
for older observers. Experimental Aging Research,
20(1), 11-23.

Knowles, M. S. (1975). Self directed learning: A guide for
learners and teachers. New Jersey: Cambridge.

Knowles, M. S. (1980). Modern practices of adult education.
Chicago, IL: Associated Press.

Knowles, M. S. (1981). The adult learner: A neglected
species (2nd. ed.). Houston: Gulf Publishing Company.

Knowles, M. S. (1990). The adult learner: A neglected
species. Houston: Gulf.

Knowles, M. S., Holton, E. F. III, & Swanson, R. A. (1998).
The adult learner. Houston: Gulf.

Kurpius, D. (1978). Learning: Making learning environmaents
more effective. Indiana: Accelerated Development Inc.

Ledford, B. R. (1981). Interior design: Impact on
learning achievement. In P. J. Sleeman & D. M. Rockwell
(Eds.). Designing learning environments (pp. 160-173).
New York: Longman.

Leedy, P. D. (1997). Practical research: Planning and
design (6th ed.). Upper Saddle, NJ: Merrill, an imprint
of Prentice Hall.

- Loewenfeld, I. E. (1979). Pupillary changes related to age. In H. S. Thompson (Eds.), Topics in neuro-ophthalmology. (pp. 124-150). Baltimore: Williams & Wilkins.
- Long, H. B. (1992). Self-directed learning: Application and reserach. Norman, OK: Research Center for Continuing Professional and Higher Education at the University of Oklahoma.
- Long, R. (1987). Beefing up an image. Restaurant & Hotel Design, 9, 76-81.
- Mahnke, F. (1981). Color in medical facilities. Interior Design, (52), 256-263.
- Mehta, R., & Sivadas, E. (1995). Comparing response rates and response content in mail versus electronic mail surveys. Journal of the Market Research Society, 37, 429-439.
- Markel, C. (1999). Folkloristics of educational spaces: Material lore in classrooms with and without walls. Library Trends, 47(3), 417-438.
- Mehrabian, A., & Russell, J. A., (1974). An approach to environmental psychology. Cambridge, MA: Massachusetts Institute of Technology.
- Merriam, S. B., & Cafferalla, R. S. (1999). Learning in adulthood: A comprehensive guide (2nd ed.). San Fancisco: Jossey-Bass.
- Michel, L. (1996). Light: The shape of space. New York: Van Nostrand Reinhold.
- Muller, K., Probasco, J., & Schuh, M. P. (1985). Space planning guidelines for institutions of higher education. CEFP Journal, 23(5), 15-17.

- Mustanski, B.S. (2001) Getting wired: Exploiting the Internet for the collection of valid sexuality data. The Journal of Sex Research, 38(4), 292-301.
- Myers, J. (2004). The color of learning. Training and Development, 58(2), 25-30.
- Nielson, K. J., & Taylor D. A. (2001). Interiors: An introduction (3rd ed.). New York: McGraw-Hill.
- Nuckolls, J. L. (1983). Interior lighting for environmental designers (2nd ed.). New York: John Wiley & Sons.
- O'Brian, M. (2001). Teaching style and teaching philosophies of rehabilitation educators. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.
- Owu, M. (1992). Classrooms for the 21st Century. Planning for Higher Education, 20, 12-20.
- Pile, J. F. (1995). Interior design. (2nd ed.) New York: Harry N. Abrams, Inc. Publishers.
- Plude, D. J., & Hoyer, W. J. (1985). Attention and performance: Identifying and locating age deficits. In Charness (Eds.), Aging and performance (pp. 47-99). New York: Wiley.
- Rath, G. J., & Ittleson, J. (1981). Human factors for educational facilities. In P. J. Sleeman & D. M. Rockwell (Eds.), Designing learning environments (pp. 142-159). New York: Longman.
- Rea, M. S. (2000) The IESNA lighting handbook: Reference and application. New York: The Illuminating Engineering Society of North America.
- Rogers, C. R. (1969). Freedom to learn. Columbus, OH: Merrill.

- Salant, P., & Dillman, D. A. (1994). How to conduct your own survey. New York: Wiley
- Schaefer, D. R., & Dillman, D. A. (1998). Development of a standard e-mail methodology: Results of an experiment. Public Opinion Quarterly, 62, 378-397.
- Schleyer, T. K. L., Forrest, J. L., Kenney, R., Dodell, D., & Dovgy, N. (1999). Is the Internet useful in clinical practice? Journal of the American Dental Association, 130, 1502-1511.
- Schmidt W. C. (1997). World-wide web survey research: Benefits, potential problems, and solutions. Behavior Research Methods, Instruments, and Computers, 29, 274-279.
- Schutt, R. K. (1999). Investigating the social world: The process and practice of research. Thousand Oak, CA: Pine Forge Press
- Simsek, Z., & Veiga, J. F. (2001). A primer on Internet organizational surveys. Organizational Research Methods, 4(3), 218-235.
- Smith, F. K., & Bertolone, F. J. (1986). Bringing interiors to light. New York: Whitney Library of Design.
- Soloman, D. J. (2001) Conducting web-based surveys. (Report No. EDO-TM-01-10). College Park, MD: Eric Clearinghouse on Assessment and Evaluation. (ERIC Document Reproduction Service No. ED458291)
- Sproull, L. S. (1986). Using electronic mail for data collection in organizational research. Academy of Management Journal, 29, 159-169.

- Stanton, J. M. (1998). An empirical assessment of data collection using the Internet. Personnel Psychology, 51, 709-725.
- Stanton, J. M., & Rogelberg, S. G. (2001). Using the Internet/intranet web pages to collect organizational research data. Organizational Research Methods, 4(3), 200-217.
- Sundstrom, E., & Sunstrom, M. G. (1986). Work places. Cambridge, UK: Cambridge University Press.
- Swoboda, W. J., Muhlberger, N., Weitkunat, R., & Scheneeweib, S. (1997). Internet survey by direct mailing: An innovative way of collecting data. Social Science Computer Review, 15, 242-255.
- Taylor, H. (2000). Does Internet research work? International Journal of Market research, 42(1), 51-63.
- Tessmer, M., & Harris, D. (1992). Analyzing the Instructional Setting: Environmental analysis. London: Kogan Page.
- Thompson, J. A. (1992). American Society of Interior Designers: Professional practice manual. New York: Watson-Guptill.
- Torbert, J. B. (1987). A study of the physiological factors affecting the nature of the adult learner in the Phoenix air national guard. (Clearing House No. CE047870). Nova University. (ERIC Document Reproduction Service No. ED 284 044).
- Tough, A. (1978). Major learning efforts: Recent research and future directions. Adult Learning, 28, 250-263.

- Trinkaus, J. (1991). Color preference in sport shoes: An informal look. Perceptual and Motor Skills, 73, 613-614.
- Tse, A. C. B. (1998). Comparing the response rate, response speed and response quality of two methods of sending questionnaires: E-mail vs. mail. Journal of the Market Research Society, 40, 355-361.
- University Continuing Education Association. (1998). Lifelong learning trends: A profile of continuing higher education (5th ed.). Washington, DC: University Continuing Education Association.
- Vaughan, N. (1995). Good teaching rooms: A campus resource. Academe, 77(4), 11-15.
- Waksberg, J. (1999). What is a survey? [Brochure] Alexandria, VA: The Section on Survey Research: American Statistical Association.
- Ward, J. C., Bitner, M. J., & Barnes, J. (1992). Measuring the prototypicality and meaning of retail environments. Journal of Retailing, 68(2), 194-220.
- Weishar, J. (1992). Design for effective selling space. New York: McGraw-Hill, Inc.
- Wiersma, W. (1995). Research methods in education (6th ed.). Boston: Allyn and Bacon.
- Weale, R. A. (1961). Retinal illumination and age. Transactions of the Illumination Engineering Society, 26, 95-100.
- Whyte, W. H. (1980). The social life of small urban spaces. Washington, DC: The Conservation Foundation.
- Yu, J., & Cooper, H. (1983). A quantitative review of research design effects on response rates to

questionnaires. Journal of Marketing Research, 20, 36-44.

Zernike, K. (2001, August 5). The feng shui of schools. The New York Times, pp. A4.20.

Zold, B., Toth, T., & Tolna, J. (1986). Colour preference: A new approach. Perceptual and Motor Skills, 62, 739-752.

Appendix A

Survey

About You

---You may easily move from one item to the next
by pressing the Tab key.---

The Following information about you will help us better the
information that you provide us.

Gender: Male Female

Your Age:

Education: Please select your highest level of formal
education

- High School
- Associate Degree
- Bachelor Degree
- Masters
- Doctoral
- Other

Experience and Location

How many years of teaching experience do you have?

How many years have you worked in design?

How many years have you work in educational design?

What type of institution do you currently work for:

- Community/Junior College
- Comprehensive University/College
- Private Liberal arts University/College
- Doctorate-granting University/College
- Research University/College
- Teaching Hospital/Institution
- Other

What State is your Institution located: (Give the 2-letter zip code abbreviation for you state)

What Department are you located:

- Architectural and Design services
- Facilities Management
- Physical Plant Services
- Purchasing
- Other

Race:

- African American
- Asian
- Hispanic
- Native American
- Other

About Administrators

Directions: Please rate the following statements about administrators at your institution.

Section 1

1. Administrators at your campus consider learning to be a **service** provided by the institution.
 - Strongly Agree
 - Somewhat Agree
 - Neutral
 - Somewhat Disagree
 - Strongly Disagree

2. Administrators at your campus consider your institution to be an **education** provider to students.
- Strongly Agree
 - Somewhat Agree
 - Neither Agree nor Disagree
 - Somewhat Disagree
 - Strongly Disagree
3. Administrators at your campus feel classroom design is important.
- Strongly Agree
 - Somewhat Agree
 - Neither Agree nor Disagree
 - Somewhat Disagree
 - Strongly Disagree
4. Administrators request input from others such as faculty, students and designers when deciding how a space should be approached in design.
- Strongly Agree
 - Somewhat Agree
 - Neither Agree nor Disagree
 - Somewhat Disagree
 - Strongly Disagree

Section 2

Directions: Please rate the following statements about administrators at your institution.

When designing learning space on your campus, how do administrators request that you design space in regard to the following?

1. Administrators request you **design learning spaces** with:

A. Auditorium style seating:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

B. Fixed desk in rows facing the front:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

C. Movable desk for easy arrangement:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

- D. Tables and chairs for grouping conference style or in small work groups:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
2. Administrators request you select which **type of color schemes**:
- A. Warm color schemes (reds, yellows, oranges):
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
- B. Cool color schemes (blues and greens):
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often

C. Combinations of warm and cool color schemes:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

D. Warm neutral colors:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

E. Cool neutral colors:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

F. Combination of cool and warm neutral colors:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

- G. Combination of cool and cool neutral colors:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
3. Administrators request you specify what **type of lighting designs** in regards to switching:
- A. Specify one on/off for the entire space:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
- B. Specify multi-switching for space:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often

- C. Specify dimmable switching for space:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
- D. Specify adjustable pre-set scenes for spaces:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
4. Administrators request you specify what **type of lighting** for learning space:
- A. Incandescent lighting:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often

B. Fluorescent lighting:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

C. Low voltage lighting:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

D. HID lighting:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

5. Administrators request you specify what types of **classroom furniture**:

A. Chair desk with standard size writing surfaces:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

B. Small tables and comfortable chairs:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

C. Differing sized tables for grouping and comfortable chairs:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

6. Administrators request you design classrooms in the following regards to **layout**:

A. Make the furnishing fixed and not to move:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

B. Make the furnishing flexible and easy to move:

- Least often
- Sometimes
- Often
- Neutral
- Somewhat often
- Very often
- Most often

7. Administrators request you design **classrooms** in the following manners:

A. Provide a layout of desks in a fixed arrangement of rows facing the front of the room:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

- B. Provide a layout of desk in a circular fashion with user facing the center of the room:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
- C. Provide a layout of tables in long rows all facing the front of the room:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
- D. Provide a layout of tables arranged conference style with users facing each other:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often

F. Provide groupings of tables and chairs within the space:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

About Faculty

Directions: Please rate the following statements about **Faculty** at your institution.

Section 1

1. Faculty at your campus consider learning to be a **service** provided by the institution.
 - Strongly Agree
 - Somewhat Agree
 - Neither Agree nor Disagree
 - Somewhat Disagree
 - Strongly Disagree

2. Faculty at your campus consider your institution to be an **education** provider to students.
 - Strongly Agree
 - Somewhat Agree
 - Neither Agree nor Disagree
 - Somewhat Disagree
 - Strongly Disagree

3. Faculty at your campus feel classroom design is important.
- Strongly Agree
 - Somewhat Agree
 - Neither Agree nor Disagree
 - Somewhat Disagree
 - Strongly Disagree
4. Faculty request input from administrators, students and designers when deciding how a space should be approached in design.
- Strongly Agree
 - Somewhat Agree
 - Neither Agree nor Disagree
 - Somewhat Disagree
 - Strongly Disagree

Section 2

Directions: Please rate the following statements about Faculty at your institution.

When designing learning space on your campus, how do faculty request you design space in regard to the following?

1. Faculty request you design **learning spaces** with:
- A. Auditorium style seating:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often

B. Fixed desk in rows facing the front:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

C. Movable Desk for easy arrangement:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

D. Tables and Chairs for grouping conference style or in small work groups:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

2. Faculty request you select which type of **color schemes**:

A. Warm color schemes (reds, yellows, oranges):

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

B. Cool color schemes (blues and greens):

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

C. Combinations of Warm and Cool Color Schemes:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

D. Warm Neutral Colors:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

E. Cool Neutral Colors:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

F. Combination of cool and warm neutral colors:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

G. Combination of cool and cool neutral colors:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

3. Faculty request you specify what type of **lighting designs** in regards to switching:

A. Specify one on/off for the entire space:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

B. Specify multi-switching for space:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

C. Specify dimable switching for space:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

D. Specify adjustable pre-set scenes for spaces:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

4. Faculty request you specify what **type of lighting** for learning space:

A. Incandescent lighting:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

B. Fluorescent lighting:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

C. Low voltage lighting:

- Never
- Almost Never
- Least often
- Neutral
- Somewhat often
- Very often
- Most often

- D. HID lighting:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
5. Administrators request you specify what **types of classroom** furniture:
- A. Chair desk with standard size writing surfaces:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
- B. Small tables and comfortable chairs:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often

- C. Differing sized tables for grouping and comfortable chairs:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
6. Administrators request you design class rooms in the following regards to **layout**:
- A. Make the furnishing fixed and not to move:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
- B. Make the furnishing flexible and easy to move:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often

7. Administrators request you **design classrooms** in the following manners:
- A. Provide a layout of desks in a fixed arrangement of rows facing the front of the room:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
- B. Provide a layout of desk in a circular fashion with user facing the center of the room:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
- C. Provide a layout of tables in long rows all facing the front of the room:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often

- D. Provide a layout of tables arranged conference style with users facing each other:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often
- F. Provide groupings of tables and chairs within the space:
- Never
 - Almost Never
 - Least often
 - Neutral
 - Somewhat often
 - Very often
 - Most often

Scenario

Directions: Please choose the option that best matches your own approach of classroom design.

Section 1

The administrator of the adult continuing education center on your campus has asked you to select furniture and provide a furniture layout for newly finished space.

1. When selecting the furnishings, which of the following would you specify for the new space:
 - Chair desk with standard size writing surfaces.
 - Small tables and comfortable chairs.
 - Differing sized tables for grouping and comfortable chairs.

2. When making the decision to select furniture and plan layout, would you:
 - Choose to make the furnishing fixed and not to move.
 - Choose to make the furnishing flexible and easy to move.

4. When providing the furniture layout, you would:
 - Provide a layout of desks in a fixed arrangement of rows facing the front of the room.
 - Provide a layout of desk in a circular fashion with user facing the center of the room.
 - Provide a layout of tables in long rows all facing the front of the room.
 - Provide a layout of tables arranged conference style with users facing each other.
 - Provide groupings of tables and chairs within the space.

Section 2

The adult learning center on your campus has decided to replace the current lighting systems in four classrooms. The classrooms are used for large and small group discussions, multimedia presentations, and presentations to large groups by industry.

1. When providing this design, you would specify:
 - Incandescent lighting.
 - Fluorescent lighting.
 - Low voltage lighting.
 - HID lighting.
 - Combinations of Incandescent, Fluorescent, and Low voltage lighting.
 - All the above.

2. When providing this design, you would:
 - Specify one on/off for the entire space.
 - Specify multi-switching for space.
 - Specify dimable switching for space.
 - Specify adjustable pre-set scenes for spaces.

3. When choosing lamps for light fixtures, you would specify:
 - Warm white light.
 - Cool White light.
 - Soft white light.
 - Combinations of cool and warm light.

Section 3

The director of adult learning at your university has asked you to select new wall treatments (i.e. paint, wall paper, and decorative finishes) and floor coverings for the adult training center.

- 1 You would specify to following:
 - Warm color schemes (reds, yellows, oranges).
 - Cool color schemes (blues and greens).
 - Combinations of warm and cool color schemes.
 - Warm neutral colors.
 - Cool neutral colors.
 - Combination of warm and warm neutral colors.
 - Combination of cool and cool neutral colors.

2. You would specify the following wall treatments:
 - Smooth, hard finishes (paint on wall board or masonry).
 - Textured finishes (fabric wall covering or textured wallboard).
 - Wall paper (type II vinyl).
 - Wood paneling.
 - Combinations of smooth, hard and textured finishes.
 - Combinations of smooth, hard, textured, and wall paper.

3. When selecting Floor Coverings, you would specify:
 - Wood.
 - Ceramic tile.
 - VCT tile.
 - Carpet.
 - Cork.
 - Terrazzo.

4. When selecting carpet for learning spaces, you would:
 - Select solid color carpets.
 - Select multi-colored carpets.
 - Select solid colored borders and multi-colored fields.
 - Select multi-colored patterned carpets.

5. When selecting carpet, you would specify the following type:

- Level loop.
- Multi-level loop.
- Shag.
- Sculptured.
- Random sheer.
- Cut pile.

About Designers

Directions: Please rate the following statements about you at your institution.

1. Do you consider learning to be a **service** provided by the institution:

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

2. Do you consider your institution to be an education provider to students:

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

3. Do you feel classroom design is important:

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

4. Do you request input from administrators, faculty, students and other designers when deciding how a space should be approached in design:

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Thank you for making this study possible.
Please click the **Submit** to send your responses.

Submit

Appendix B

IRB

Oklahoma State University
Institutional Review Board

Protocol Expires: 11/18/2004

Date: Wednesday, November 19, 2003

IRB Application No ED0459

Proposal Title: Adult Learning Environments: Design Communication and Needs

Principal
Investigator(s):

W. Jinnings Burruss
207 Wes Watkins Ctr.
Stillwater, OK 74078

Gary J Conti
206 Willard
Stillwater, OK 74078

Reviewed and
Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact me in 415 Whitehurst (phone: 405-744-5700, colson@okstate.edu).

Sincerely,



Carol Olson, Chair
Institutional Review Board

2

VITA

W. Jinnings Burruss, Jr.

Candidate for the Degree of

Doctorate of Education

Thesis: ADULT LEARNING ENVIRONMENTS: THE PREFERENCES OF ADMINISTRATORS AND FACULTY, AND THE KNOWLEDGE OF INTERIOR DESIGNERS

Major Field: Adult Education

Biographical:

Education: Graduated from Bradford High School, Bradford, Arkansas in May 1989; Received Bachelor of Science degree in Home Economics, Master of Science Degree in Home Economics, and a Bachelor of Science degree in Family and Consumer Sciences from University of Central Arkansas, Conway, Arkansas in May 1993, May 1995, and August 1995, respectively. Completed the requirements for the Doctorate of Education degree with a major in Adult Education at Oklahoma State University in August, 2004.

Experience: Employed as a food service administrator for the Boy Scouts of America; Owner of interior design business; graduate assistant at University Central Arkansas; business partner of interior design of Michelle Nabholz Interiors; Resource Center Coordinator/Graduate Research Assistant at Oklahoma State University; and as a facility designer, University Extension, International and Economic Development, Oklahoma State University, 1998 to present.

Professional Memberships: American Association of
Family and Consumer Sciences, Interior Design
Educators Council, United States Institute for
Theater Technology, Association of University
Interior Designers, Illuminating Engineering
Society of North America